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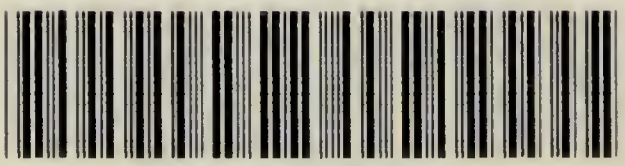

Ambulance Association.

# HINTS AND HELPS

FOR

# HOME NURSING AND HYGIENE.

A HANDBOOK FOR ALL WHO HAVE TO DO WITH SICKNESS;
ARRANGED ACCORDING TO THE SYLLABUS OF THE
SECOND (OR NURSING) COURSE OF LECTURES.

BY

E. MacDOWEL COSGRAVE, B.A., M.D., Ch.M., F.R.C.P.I.,

HONORARY LIFE MEMBER OF, AND LECTURER AND EXAMINER TO,
THE ASSOCIATION.

WITH THE ADDITION OF A CHAPTER ON THE APPLICATION
OF THE ROLLER BANDAGE.

BY

R. J. COLLIE, M.D.,

HONORARY LIFE MEMBER OF, AND LECTURER AND EXAMINER TO,
THE ASSOCIATION.

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# SYLLABUS OF LECTURES ON HOME NURSING.

## LECTURE I.

The Sick Room.—Introductory Remarks—Selection, Preparation, and Cleaning of room—Bed and Bedding—Furnishing—Warming and Ventilation—The Roller Bandage and its Application.

## LECTURE II.

Infection and Disinfection.—Infectious and Non-Infectious Cases—Quarantine of Patient—History of a Fever Case—Disinfecting and Disinfectants—The Roller Bandage and its Application.

## LECTURE III.

Details of Nursing.—The Nurse—Regulation of Visitors—Management of Nurse's own Health—Washing and Dressing Patients—Bed-making—Changing Sheets—Lifting Helpless Patients—Sick Diet—Administration of Food, Medicines, and Stimulants—The Roller Bandage and its Application.

## LECTURE IV.

Details of Nursing (*continued*).—Observation of the Sick—Rigors—Sleep—Pain—Posture—Skin—Appetite—Vomiting—Cough—Expectoration—Effects of Remedies, &c.—Temperature taking—Baths—Bed-sores—Delirium—Nursing Sick Children—What to Prepare for Physician's and Surgeon's Visits—The Roller Bandage and its Application.

## LECTURE V.

Application of Local Remedies.—Poultices—Fomentations—Blisters—Ointment—Leeches—Padding Splints—Bandaging—Personal and Family Hygiene—Management of Convalescents.

**N.B.—Except as mentioned below, no person is allowed to enter for examination in these subjects without having obtained the Certificate of "First Aid to the Injured." The pupil must also have attended at least four out of the five Lectures.**

**The Nursing Course can be commenced by the successful Candidates in the First Aid Course as soon as the result of the Examination is published, and those pupils who pass the Nursing Examination can count the same as equivalent to the FIRST RE-EXAMINATION towards the Medallion.**

NOTE.—Permission may be granted to hold or attend a Home Nursing Course before that of First Aid, in which case a lecture embracing a general outline of the Structure and Functions of the Human Body, including a brief description of the Bones, Muscles, Arteries and Veins; the Functions of the Circulation, Respiration and Nervous System; also the Triangular Bandage and its application, shall precede the Home Nursing Course, and a subsequent passing of an examination in First Aid, but not within one year from the date on the Home Nursing Certificate, shall be a *sine quâ non* for eligibility for the Medallion, the "Final" (on both subjects) being held not less than one year from the date on the First Aid Certificate.

All candidates for examination on the Home Nursing Course, including those who have been permitted to attend the lectures without having *passed* in First Aid on the condition mentioned in the preceding paragraph, must be prepared to do all the practical work detailed at page 2 of Paper $\frac{80}{1899}$ under the heading "NURSING CLASSES," including the "*neat and quick application of the triangular bandage to any part of the body.*"

Home Nursing Classes for men (only) can be arranged in the same manner as for women, this syllabus being used by the Lecturer.

*Mixed Classes of men and women are on no account permitted.*

**No Lecturer may examine his own Class for Certificates.**

**Lecturers instructing a Home Nursing Class can obtain further particulars on application to the Chief Secretary for "Paper Reference No. $\frac{80}{1899}$."**

Women holding both the First Aid and Home Nursing Certificates can undergo practical instruction in Hospital Nursing at the Chelsea Infirmary. Terms from the Chief Secretary.

A modified Syllabus for "Junior Classes" has been authorised. Copies can be obtained from the Chief Secretary. Reference "No. $\frac{18}{1900}$."

The following may be obtained on hire for a nursing class for a fee of five shillings: Thirty Triangular Bandages, One Clinical Thermometer, One Invalid Feeding-cup, and One Bandage-winder. Roller Bandages cannot be lent on hire.

Full particulars as to the work of the Association can be obtained from the CHIEF SECRETARY, St. John's Gate, Clerkenwell, London, E.C.

To

COLONEL FRANCIS DUNCAN, C.B., M.P., R.A.,

M.A., D.C.L., LL.D.,

WHO FIRST LED THE AUTHOR

TO ENGAGE IN AMBULANCE WORK,

THIS BOOK

IS GRATEFULLY DEDICATED

# PREFACE.

This book is written in the hope that it may be of assistance to all who have to nurse the sick.

The arrangement is in conformity with the Syllabus of the Nursing Lectures of the St. John Ambulance Association.

Although arranged in this form, it is more than a book of lectures, as the subjects are dealt with in fuller detail than could be done by a lecturer in a short course.

It is felt that what the members of ambulance classes should have in their hands is, not a book of lectures to compare with those they are listening to, but a book of reference, where they can find out what they have forgotten, and get further particulars when desired.

To the St. John Ambulance Association this book is given in the hope that it may do even a very little to further the noble work it is carrying on so successfully.

*Pro Utilitate Hominum.*

E. MacD. C.

24, *Gardiner's Place, Dublin.*

# PREFACE TO THE ILLUSTRATED EDITION OF 1895.

With a view to meet the demand for a treatise on the use of the roller bandage, which has to a great extent arisen in consequence of the vast increase in late years in the numbers of nursing classes, both men and women, organised and examined by the St. John Ambulance Association, the Central Executive Committee decided that an illustrated Chapter on the subject should be added to their authorized text-book for the nursing course.

Dr. Cosgrave, the author of the work, not having sufficient time at his disposal to undertake the task of writing the Chapter, Dr. R. J. Collie very kindly volunteered to do the work, and his offer was gratefully accepted by the Committee, with the result that the practical value of the Manual has been very greatly enhanced.

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## CHAPTER IV.

### DETAILS OF NURSING.



## CHAPTER V.

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### APPLICATION OF LOCAL REMEDIES.

## CHAPTER VII.

### THE ROLLER BANDAGE AND ITS APPLICATION.



## APPENDIX I.



## APPENDIX II.



## APPENDIX III.

# NURSING TEXT BOOK.

## CHAPTER I.

### THE FUNCTIONS OF THE LIVING BODY.

#### WHY THIS LECTURE IS GIVEN.

In the first course of lectures in connection with the Ambulance department of the Order of St. John of Jerusalem, those on "First Aid to the Injured," a general sketch of the structure and functions of the human body is given. These details are supposed to serve as a sufficient introduction to this course on Home Nursing and Hygiene.

However, such a wide subject can only be dealt with very cursorily in a single lecture, and facts so new to many, and of such varied import, can hardly be remembered from a single hearing. Also, Nursing is something more than "First Aid." A nurse's duty does not end when the doctor arrives, but it is from that moment that it may be really said to begin. For these reasons the present lecture will be devoted to a sketch of those points in the living human organisation which affect a nurse, and a knowledge of which will make her fit, not only to obey, but, when the necessity arises, to skilfully and effectually originate.

The points it is intended to treat of are: the *Circulation* of the blood; *Breathing*, and how the oxygen of the air enters into the blood; *Digestion*, and how the digested food passes into the blood; *Oxidation*, or how the air and food burn together, giving heat and power; *How the heat of the body is regulated*; and how the *Nervous system controls all these processes*.

To understand these points it is necessary to thoroughly understand the uses of certain vessels, which, although so small as to be quite invisible to the naked eye, are yet the medium by which all these different processes are enabled to go on.

*Capillaries* are found in all living parts of the body. They are minute blood vessels, with walls so thin that the fluid parts of the blood and the white corpuscles can escape through them. These capillaries are so numerous that the body may almost be said to be full of them. Muscle, bone, lungs, heart, &c., are a regular net-work of capillaries. However, thickly as the capillaries are placed in the body, there are spaces between them, and it is in these that the burning of the food and of part of the body goes on, and to them the fluids of the blood part with the pure and nourishing particles received from the food, taking up from them the impure and used-up particles which have to be removed from the body.

### CIRCULATION OF THE BLOOD.

The circulation of blood is easy to follow. The blood is contained in a *series of closed tubes*, and flows round and round, the moving power being the heart. The blood is changed in character where the vessels have such thin walls that fluid can pass through them—that is, in capillaries.

The blood, on *leaving the heart*, passes through three kinds of vessels, *arteries*, *capillaries*, and *veins*. To make one complete circuit the blood must pass twice through the heart, and twice through arteries, capillaries, and veins.

It is best at first to divide the circulation into its two parts, and to consider them separately. First, the lesser, purifying, or *lung* circulation. Secondly, the greater, nourishing, or *body* circulation.

The heart is divided into halves, between which there is no direct communication. In the *lesser circulation* the blood leaves the right side of the heart by an artery, and passes through the capillaries of the lungs, returning through veins to the left side of the heart.

In the *greater circulation* the blood leaves the heart by a large artery, the aorta. This gives off branches which again divide and sub-divide, until they finally branch into capillaries throughout the entire body, even including the substance of the lungs which could not be nourished by the impure blood from the right side of the heart. These capillaries join, branch off, and communicate, forming a regular network, finally running together and forming small veins, which soon unite to form larger, these again uniting until at length two large veins are formed, which open into the right side of the heart, one collecting the blood from the upper, and the other from the lower part of the body.

Each side of the heart is divided into two chambers, or cavities; the upper ones are called *auricles*, because they outwardly look somewhat like dogs' ears, and the lower *ventricles*, since they form the body of the heart.

The walls of the auricles are very thin, but the walls of the ventricles are very strong; the left ventricle is

much the strongest. The reason of this is that the different chambers of the heart have different functions, the auricles do little more than collect the blood, whilst the ventricles have to act like force-pumps; the right ventricle has only to pump the blood through the lungs, but the left ventricle has to force it through the entire body.

If the heart were merely a hollow organ, alternately contracting and expanding, the blood would be alternately driven from and drawn to the heart, but there would be no regular circulation. The circulation depends in a great measure upon certain structures called *valves*, whose effect is only to allow the blood to move in one direction.

There are four of these valves, two of them are connected with each side of the heart, one is placed between each auricle and ventricle, and the other between each ventricle and the large artery leaving it. These valves are folds of membrane attached to the walls of the heart and of the great blood vessels where they leave the heart, and so arranged as to be washed back against the walls when the blood is flowing in the right direction, whilst if it moves in the wrong direction it gets behind the valves, washing them out so that they meet in the middle and so stop the progress of the blood.

The heart contracts some 60 to 80 times a minute, forcing the blood into the arteries and causing the phenomenon known as the pulse. First, the auricles contract, driving the blood into the ventricles, then the ventricles contract, driving the blood into the arteries, then there is a pause, during which the auricles are filled by the blood poured in from the veins. The contractions are then repeated. When the auricles contract, the

valves open, letting the blood into the ventricles (the pressure of the blood in the veins prevents the blood going back that way). Then, when the ventricles contract, the valves close, preventing the blood returning to the auricles, and the other valves open, letting the blood out into the arteries. As soon as the ventricles cease contracting, these last valves are closed by the elasticity of the arteries, which having been over-distended by the contraction of the ventricles, contract, attempting to drive the blood back. The ventricles remain closed and empty until the auricles contract and fill them.

The course of blood is then as follows:—It passes from the *right auricle* to the *right ventricle*, from that into the *pulmonary artery*, which conveys it to the lungs; here it passes through a myriad of *capillaries running round the walls of the air cells*. It then passes into *veins*, which join finally into four *pulmonary veins*, which open into the *left auricle*. From the *left auricle* it starts on the greater or nourishing circulation, passing into the *left ventricle*, from that into the *aorta artery*, thence to the arteries and capillaries of the head, trunk, limbs, tissues of the lungs, and of all the other parts of the body, being finally gathered into the two large *veins* (the venæ-cavæ, superior and inferior), which open into the *right auricle*.

It must be remembered that this double circulation goes on simultaneously, both sides of the heart contracting together.

The heart beats slower when the body is horizontal; this is one of the ways in which it gets rested, and so taking stimulants at night acts injuriously by making it beat quicker and preventing it getting its needful rest.

It will now be necessary to show how the blood becomes fitted to nourish and support the body by receiving the products of respiration and digestion.

## RESPIRATION.

*Respiration*, or the act of breathing, is performed about seventeen times a minute. The entire act consists of air being drawn in (*inspiration*), air being given out (*expiration*), and a very slight pause.

The object of respiration is to bring the oxygen of fresh air into contact with the blood as it passes through the lungs.

The structure of the lungs is admirably fitted for this purpose. When the air is inspired it passes through the mouth or nostrils into the back of the mouth (pharynx); here it passes through an opening into the larynx or voice-box (this opening has a lid, the epiglottis, standing in front of it; this lid is pressed down over the opening when food is swallowed. The food passes over the opening as over a bridge, and is thus prevented from getting into the air passages). It then goes down through the wind-pipe, which finally splits into two portions, one of which goes to either lung.

As soon as these tubes reach the lungs they divide and sub-divide until, as they reach the outer part of the lungs, they form thousands of little tubes, each of which ends in a dilated bladder-shaped extremity, or *air-cell*.

These air-cells have very fine walls, all over which a multitude of tiny little blood-capillaries run. Now, small as these air-cells individually are, adding them all together they represent an immense surface, so that when

the capillaries are filled with blood, and the air-cells with air, the effect is much the same as though the blood were spread thinly over a dining-room table in free contact with the air; and since the walls of the cells are so thin that gases can pass to and fro through them, it is plain that every particle of the blood is brought freely into contact with the air.

A change takes place in air when it is breathed. We know that when many people have been for a short time in a small room, the air becomes close and unpleasant to breathe. If in such a room some of the air were shaken up with fresh lime-water, a white chalky deposit would result. If a person breathed through a glass tube into lime-water the same thing would occur. But if fresh air were passed through lime-water, the water would remain clear and unaltered.

The appearance of this deposit proves the presence of a poisonous gas called carbonic acid. It is the gas that makes mineral waters effervesce, and is a poison that acts injuriously when breathed, but not when swallowed. If the air that is inspired is pure, and the air that is expired is impure, it is manifest—since the change occurs in the body—that the impurity must be given off from the body. That this is the case is proved, it being found that it is the blood which gives off the carbonic acid gas.

The blood in the lungs is separated from the air by the thin walls of the capillaries, and it is necessary to refer to a natural law to explain how the carbonic acid gas escapes from the blood in the walls to the interior of the air-cells.

This law is called the law of *diffusion of gases*, and may be briefly stated thus: when two gases are separated by a moist membrane they will gradually pass through

the membrane and mix, the lighter gas passing through the more rapidly.

It is this that prevents balloons staying up unless carefully varnished. The light gas escapes from them rapidly, the heavy atmospheric air slowly taking its place.

The walls of the capillaries are formed of membrane, and are kept moist by the blood; the gases of the blood are therefore in a position to change places with the air in the cells.

Atmospheric air is composed, roughly speaking, of four parts of nitrogen to one of oxygen. The oxygen is the useful active principle; the nitrogen merely acts by diluting the oxygen, which by itself would be too strong.

The *blood is formed* of a clear, nearly colourless, fluid, containing a few *white* particles or corpuscles, and numerous *red corpuscles*. It is the great number of the latter that give blood its red colour. These red corpuscles always contain some oxygen; when they contain a great deal they are of a bright red colour, but when they contain only a little they change more nearly to purple. They are red in the arteries, and purple in the veins, the difference of colour being one distinction between arterial and venous blood.

The change from red to purple takes place all through the body in the capillaries. The change from purple to red takes place in the capillaries round the air-cells of the lungs.

In the lungs the change consists in *carbonic acid gas* leaving the venous blood as it passes through the capillaries, and entering into the air-cells, the *oxygen* of the air at the same time leaving the air-cells and entering into the red corpuscles in the capillaries.

As will be seen further on, the *oxygen* got in the lungs leaves the red corpuscles in the capillaries throughout the body, going into the tissues to nourish them; the *carbonic acid*, which is a refuse product, on the other hand entering into the blood, and being borne to the lungs to be got rid of there.

The carbonic acid is not got rid of directly on entering into the air-cells. The lungs contain a good deal of air, and only part is changed by each breath. If all were emptied out at each expiration, the gas could not pass from the blood until the lungs opened out again; but as the lungs are only partly emptied, the gases enter and leave the blood continuously.

It is by means of the diffusion of gases before mentioned that the fresh air reaches the air-cells, and the foul gas in the air-cells escapes, to be discharged by the mouth. Each breath taken draws fresh air some distance down the windpipe; here it meets the carbonic acid, and changes places with it. The oxygen thus gradually diffuses its way down to the air-cells, and the carbonic acid gradually works its way out.

The chest generally contains about 200 cubic inches of air. Only 20 to 30 are breathed in or out in ordinary respiration.

*A double process thus goes on in the lungs. The air is taken in with plenty of fresh oxygen in it, and is discharged foul with carbonic acid; and the blood reaches the lungs laden with carbonic acid, and departs with a cargo of pure health-giving oxygen.*

### DIGESTION.

It is easy to understand the process of *digestion* if its use be understood. The two great ends achieved by

digestion are, that it renders food soluble, and makes it capable of undergoing "osmosis."

Osmosis is to fluids what "diffusion" is to gases. If two ordinary fluids are separated by a moist membrane, they will gradually pass through the membrane and mix. The rate at which they will pass depends greatly upon their density. The less the density of a fluid (*i.e.*, the lighter it is) the more rapidly it will pass. Thus, if a bladder of water were placed in a vessel containing salt and water, the bladder would become gradually emptied, owing to the water passing out quicker than the salt and water could pass in.

There are some fluids, however, which are incapable of undergoing osmosis. Meat and starch are examples of this; they must be changed in character before any solution of them can undergo osmosis. These exceptions have an important bearing on digestion, as they explain how it is that in the process of digestion certain foods are simply dissolved whilst others are entirely changed in character.

The *great agents of digestion* are the *fluids which are secreted by various organs*, and the *heat of the body*.

The fluids are, the *saliva*, formed by glands in the neighbourhood of the mouth; the *gastric juice*, the *bile*, and *pancreatic juice*, and the *intestinal juice*. Each of these fluids has its own particular function to perform, and they do not act equally on every article of diet.

*Foods* are, of course, very various, but for our purpose it is only necessary to consider the great classes into which they are divided.

We have *meat*, which contains a very large proportion of *nitrogen*, besides *carbon*, *hydrogen*, and *oxygen*. Nitrogen also occurs in certain parts of milk and of some

vegetables such as oatmeal and lentils. Then we have *fats*, which contain *no nitrogen*, but only the three other elements. Then we have *starches*, which also only contain *carbon*, *hydrogen*, and *oxygen*. They have less hydrogen than fats, and do not give off so much heat in the body, as all their hydrogen is already joined with oxygen in the form of water, and so is not available for "burning" in the body with the oxygen taken in by the lungs. Then we have *sugars*, which are similar in composition to starches, and *salts*, several of which enter into our food, either combined with it or separately, as, for instance, common table-salt *(chloride of sodium)*.

We have thus five classes of food, and in order to understand digestion we must see how they become dissolved, and capable of undergoing osmosis.

In the first place, *salts* may be dealt with. They are soluble, and become dissolved either in the mouth or stomach. They then pass into the blood capillaries of the stomach by osmosis.

The fate of the *sugars* is also easily understood and traced, being the same as that of the salts.

It will now be most convenient to trace the course of the digestion, following out, as it were, the fate of *starch*, *meats*, and *fat*.

In the *mouth* food is cut up and ground by the teeth, and intimately mixed with the *alkaline saliva*. The *saliva* contains a principle (ptyalin) which has a peculiar action on starch, turning it into sugar. (This is the cause of the sweet taste which bread gets when it is retained longer than usual in the mouth.)

The food is then swallowed; when it reaches the *stomach* the *acid gastric juice* checks the change of starch

into sugar, but the sugar already formed is absorbed into the blood.

The *gastric juice* acts on the meat, gradually breaking it up and rendering it soluble—in fact, changing it quite as much as starch is changed when it is turned into sugar.

*Gastric juice* contains *hydrochloric acid* ("spirits of salts"), and a principle called *pepsin*, which has the power of changing meat, white of eggs, &c., into *peptone*, a substance which is soluble, and able to pass through moist membrane by osmosis. Some of this *peptone* is absorbed in the stomach and the rest in the intestines.

The only effect the *gastric juice* has on fat is to break it up into very small particles, by dissolving away the fibres of membrane which hold the particles together.

When the food is reduced to an evenly fluid mass *(chyme)* by the action of the *gastric juice*, and by the movements of the stomach which cause it to circulate round and round, the muscular fibres closing the right-hand orifice of the stomach relax, and the food passes into the intestine.

In the *intestine* it first meets with *bile* (secreted by the liver) and the *pancreatic juice* (secreted by the pancreas, or sweetbread). The action of these fluids is chiefly on the fat, and is similar to that of strong soap, breaking the fat up into the minutest possible particles, and mixing these particles with the fluid contents of the intestine.

Milk, if examined under a microscope, is found to consist of a clear transparent fluid, with numbers of little greasy particles floating about in it. The apparent white colour is due to the light being reflected back by these particles of fat. The intestinal contents, after the action

of the *bile* and *pancreatic juice*, is in the condition of milk, the infinitesimally small fatty particles reflecting the light, and causing the whole fluid to appear milky white. It is now called *chyle*.

The food is next subjected to the influence of the *intestinal juice*, and by it and the pancreatic juice the actions of the *saliva* and *gastric juice* are both repeated. As the *chyle* passes through the intestine, the remaining starch becomes converted into sugar, and the meat and other substances containing nitrogen into *peptone*. All the food that is suited for nourishing the body is now fitted for its task.

### ABSORPTION.

We must now trace the process of *absorption*, or the means by which food enters into the system.

As already mentioned, some of the food is taken up into the capillary blood vessels of the stomach, more is also taken up by the capillary blood vessels of the intestines, but by far the greater and most important part is absorbed by a system of vessels formed for that purpose, and called *lymphatics*, or sometimes—and badly—*lacteals*.

The interior of the intestine is like velvet, being covered with numerous projections representing the pile. Each of those little projections, or *papillæ* (so called because they are finger-shaped), contains a network of lymphatic tubes connected with one entering at the base. As the intestinal contents passes along it is absorbed, or drawn into, these fine lymphatics, and thus the dissolved *peptone*, sugar, and the tiny particles of fat enter into the system.

The lymphatics pass out at the bases of the papillæ and run together, at length forming the *thoracic duct*, a

vessel which passes up in front of the spinal column and discharges its contents into the junction of two large veins at the left side of the neck. The opening is protected by a valve, so that the blood cannot get down into the *lymphatics*.

We can now sum up two things; first, how food gets into the system, and secondly, how the body receives the substances necessary for nourishment.

*Food is thus digested*:—

Salts and sugar are dissolved in the mouth or stomach.

Starch is changed into sugar in the mouth and intestines.

Meat and other nitrogenous bodies are turned into peptone in the stomach and intestines.

Fats are broken up so small in the intestines that they become capable of being absorbed.

*Food is thus absorbed*:—

Partly by the capillaries of the stomach and intestines, but chiefly by the lymphatics in the walls of the intestines.

*The body receives nourishment through the blood thus*:—

The venous blood returning to the right side of the heart receives the dissolved food from the lymphatics. The blood is then pumped through the lungs, where it receives oxygen from the air, and parts with some of its load of carbonic acid gas. It then returns to the left side of the heart, and from that is pumped all through the body, bearing the food and oxygen necessary to nourish the body and keep up the temperature.

## OXIDATION.

The next point to be dealt with is *how the oxygen and the food combine* so as to nourish the body and keep up the temperature.

In a steam-engine material is required to replace worn-out parts, and also to supply fuel; and so fresh iron and coal are necessary to keep an engine in repair and going. In the living body the same two ends have to be served; the parts have to be repaired and the temperature kept up. But the materials used cannot be divided into two such distinct classes. The terms "flesh-formers" and "body-warmers" are indeed often applied respectively to the foods with and without nitrogen, but not with perfect correctness, as both classes of food may act sometimes as flesh-formers, and sometimes as body-warmers.

The reason of this difference is that as the tissues of the body are used up or worn out they are burned. All food must therefore be capable of giving heat. A little of it may be burned up at once, but even the part that is formed into tissue must be such that, when the time comes, it too may burn, giving out, it may be, force, but always with the accompaniment of heat.

The process of burning is known in chemistry as "*oxidation.*" It takes place whenever any element *unites with oxygen.* If the process of oxidation is very slow, it is accomplished quietly, as when iron rusts; but when it takes place rapidly, both light and heat are evolved, as when a fire burns.

A simple experiment illustrates this forcibly. If a small piece of the rare metal, *potassium,* is thrown into water (which is composed of oxygen and hydrogen), it becomes rapidly oxidised, joining with the oxygen and

setting the hydrogen free. So rapidly does this occur, and the heat given out is so great, that the hydrogen catches fire, its flame being coloured red by the vapour of the potassium. Thus the paradox of burning water is solved.

In the living body oxidation takes place with medium rapidity, so that heat but not light is evolved.

The cause, then, of "*animal heat*" is the burning that goes on, especially in the spaces between the network of capillaries throughout the body. The muscles and glands are the main sources of this heat. The body is always changing, particularly when most used. The used-up tissue which is cast off is what has been burned up with the oxygen taken in at the lungs and conveyed through the body by the blood. So that the power and heat of the human body are formed by the burning of tissues—built up out of food—with the oxygen got from the air.

The power manifested in the body arises from the burning. Just as the furnace of an engine affects the water in the boiler, causing it to expand into steam, and the effect is that the wheels go round and the train moves on, so in the human body, fuel is burned up, muscles contract, and movements result.

The process of burning changes complex forms into simple. Most foods are composed of elements mingled in a complicated manner, but the products which result from their burning are of simple construction. Most of the non-nitrogenous food passes off in watery vapour (as in the breath and perspiration), or of carbonic acid gas.

It is interesting to notice how plants and animals cater each for the other. Animals take in oxygen and give out carbonic acid gas. Plants absorb carbonic acid

gas, and, retaining the carbon, give out the oxygen. Animals eat vegetables, and obtain heat by changing the complex vegetable forms into simple water and carbonic acid gas. Plants take the water and carbonic acid gas, and, with the aid of the sun, grow, changing them into their own substance, forming them into complex bodies —as it were, storing up sun-heat, which is to be set free when the vegetables are burned in the bodies of animals.

## REGULATION OF TEMPERATURE.

The regulation of the temperature of the body is a subject of great importance and interest. Different as are the circumstances in which the body is placed as to climate, clothes, food, &c., as long as health remains it varies scarcely, if at all, in temperature.

One part of the body is always in or about the same temperature as another, because wherever heat is generated it is at once taken up by the blood and carried through the body; as the blood completes the entire circuit, returning to the heart again in about half a minute, any increase of temperature is rapidly spread over the body.

It is chiefly by means of *evaporation* that the temperature is maintained at a constant height, no matter what the heat of the atmosphere or how much heat is being produced in the body; and its action—like that of a safety-valve—is self-regulating; the more heat formed, and the hotter the surrounding air, the greater the evaporation.

The effect of evaporation is cold, and it occurs most freely when fluid is exposed to the action of hot and

dry air, so to reduce the temperature of the body some fluid ought to be presented to the surface, where it might evaporate into the air.

The fluid which fulfils this condition is the blood, the capillary vessels of the skin are the vessels which bring it near the surface when required. These capillary vessels exude perspiration (through the glands for that purpose, over two million of which exist in the human skin, and this perspiration evaporating, cools the blood in the skin, which, mixing with the rest of the blood, reduces its temperature.

The "*self-regulation*" *of the temperature* is managed thus:—Cold affects the nervous system, causing the vessels of the skin to contract, whilst heat allows them to relax. When the vessels are contracted very little evaporation goes on, but when dilated a great deal. The processes thus exactly balance each other, the greater the heat the greater the evaporation, and *vice versa*.

The pale chilled skin on a cold day shows that the blood has been driven into the interior of the body to preserve its warmth, whilst the red moist skin on a warm day shows that superfluous heat is escaping. The effects of exercise are also counter-balanced, the heart beats quicker, and the vessels of the skin dilate; the lungs also do increased work, and more heat is given off in the breath.

The skin is the great medium of feeling, as it contains so many "nerve-endings," and so the more blood it contains the greater the *feeling* of warmth. Alcohol is popularly supposed to give heat, because it has a paralysing effect on the nerves controlling the vessels of the skin, and so the vessels dilate; but in reality it has a cooling effect, for the great fulness of the vessels of the skin

allows heat to escape and be wasted, the result being that the thermometer shows a fall in temperature shortly after alcohol has been taken.

## HOW THE VITAL PROCESSES ARE CONTROLLED.

The last point to consider is how the beating of the heart, the working of the lungs, digestion, the motions we are conscious of, taste, sight, hearing, smelling, the feelings of hunger and thirst, and all other living actions are manifested and regulated so as to properly balance each other.

The *nervous system* is the means by which all parts of the body are connected together, and enabled to act in concert. From the brain and spinal cord, nerves, first large but soon dividing and subdividing until they form minute white threads, flow to every part of the body. Some go to the skin, others to the muscles, and others to the organs of special sense; but wherever they go they are the medium through which the functions of that particular part are performed.

The *nerves* may be divided into two great classes. If we "will" to move a hand, the message is carried *from the brain* to certain muscles, which contract and so cause the hand to move. If we touch a table and recognise that it is flat and hard, it is through the information carried by nerves from the hand *to the brain* that we gain this knowledge.

The first group of nerves is called "motor," as they give rise to motions; the latter "*sensory*," as they convey sensations. Their combined action is seen, for instance, when we touch something hot, and withdraw the hand to escape being burned, the sensory nerves conveying

the sensation of heat to the brain and the motor nerves, in consequence setting the muscles in action to avoid the hot object. The rapidity of nervous action can be seen from the promptitude with which the hand is withdrawn.

Motor nerves have all the one function, namely, to cause muscles to contract. Sensory nerves have different functions, according to the part they go to. Those going to the skin convey the sensation of touch; those to the tongue, touch and taste; those to the eye, sight; those to the nose, smell; those to the ear, sound.

Most of the involuntary motions of the body, such as breathing, the circulation of the blood, and digestion, are controlled by the *sympathetic nervous system*, the "brains," or centres (*ganglia*) of which are found in front of the spinal column. They are connected with, and act in concert with, the nerves from the brain and spinal cord.

The sympathetic nerves control the regulating machinery of the temperature of the body, deciding whether heat is to be given off or preserved.

Such is a sketch of the functions of life, as manifested in the human body. A knowledge of the healthy processes of life is the first essential in combating with disease.

# CHAPTER II.

## THE SICK-ROOM.

### SELECTION OF A SICK-ROOM.

A good deal depends upon the *choice* of a *sick-room*, as patients will recover more rapidly in a large airy room with a sunny aspect than in one where the opposite conditions prevail; and not only may recovery be retarded by faulty surroundings, but in some sicknesses want of ventilation and sunlight may as surely lead to a fatal termination as want of food.

When possible, a *large* room should be chosen. It should be *lofty*, to assist proper ventilation, and as a low ceiling has an oppressive effect, particularly in any case of illness where respiration is difficult.

Just as a plant grown away from the light is white instead of green, so a human being deprived of light becomes pale, listless, and "out of sorts." So light may be looked upon as a positive necessity of life. In illness the necessity is still greater, as the body has not only to remain in a normal condition, but has actually to progress from disease to health.

To obtain sufficient *light* a large window and good aspect are necessary. The aspect should be south, south-west (in the Southern hemisphere, north, north-west) or west. A northerly (in the Southern hemisphere, southerly) or easterly aspect must be avoided. The

early morning light is of no use to invalids, but is rather a disadvantage, as it may lessen the hours of sleep, some people being unable to sleep when the room is light. The morning sunshine is also sometimes made an excuse for barricading the window until not only the light but the air is excluded. The evening light is also of the utmost importance. The afternoon generally wearies and depresses an invalid, and with the fading light chilliness comes on. Now is the time to draw up the blind, and make the most of the bright gleam that so often comes before sunset. Unless the sick-room has a proper aspect this cannot be done.

For the room to be sufficiently *airy* the window must open at the top and bottom, and the chimney must be free. The top of the window and the chimney are the two important openings for ventilation. Unfortunately illnesses have sometimes to be got through in rooms without chimneys, but in dealing with the choice of sick-rooms such an objection need not be contemplated, as no one would *choose* such a room.

## PREPARATION AND CLEANING OF THE SICK ROOM.

If the room that is selected for the patient has not been used for some time, it ought to be carefully examined before he is moved into it. It should be seen to be thoroughly clean, airy, and dry. The walls should be dusted and the floor and wood-work wiped with a cloth wrung out of hot water; a little Condy's fluid may be added to the water with advantage. If necessary, the floor can be washed, but it is better not to do this if the patient is to be soon moved into the room.

The chimney must be seen to be clear, and a fire should be lit and the air of the room heated to about 60 deg. Fah. If the chimney does not draw well, holding a lighted newspaper a little way up will assist by heating the column of air, and will often save many of those disagreeable downward puffs which have such an irritating effect upon the eyes and temper.

All superfluous articles of furniture should be removed from the room and needful ones substituted.

Whilst a sick-room should not contain unnecessary articles of furniture, as they only collect dust and are a common means of conveying infection, it should not look bare or cheerless. If it is neat and everything in it is clean and nicely arranged, a vase of flowers and a picture or two will be quite sufficient to make it look both pleasant and comfortable.

## THE BED.

"Four-posters" have, fortunately, become so nearly extinct as not to need much notice. They are, however, quite unfitted for cases that require much nursing.

An *iron bedstead* is the best. It should be 3ft. or 3½ft. wide and (for an adult) 6½ft. long. The full length is required to enable the patient to be easily lifted or moved, to allow the sheets to be changed, &c. The narrowness saves the invalid and attendants much fatigue. A wide bed gives continual trouble, as every attention—such as raising up an invalid's head and re-arranging the pillows—is done at arm's length, and consequently at a disadvantage, or else it is done kneeling on the bed, which shakes the patient and tries the nurse.

## THE BEDDING.

The feather bed is, happily, rapidly following the "four-poster" to oblivion. It is bad enough in health, but in serious illness it is so dangerous to the invalid and troublesome to the attendants as to be perfectly unendurable. The patient sinks into it, and so it is difficult to move him, whether to attend to injuries, to dress wounds, or for any other purpose. It also soon becomes uncomfortable, and yet cannot be arranged without greatly disturbing the patient. If it gets wet the trouble is still greater.

A *hair mattress* is certainly the best, but an evenly-packed straw or chaff one is nearly as good. One great advantage of a chaff bed is, that if it is spoiled it can be emptied and the cover washed and re-filled, all being done easily, rapidly, and cheaply.

A very satisfactory mattress is one stuffed in two horizontal layers, the upper one being composed of horse-hair and the lower of some kind of coir. It is used on iron bedsteads, without any palliasse, and is economical and yet as comfortable as a spring bed.

It is better that no palliasse of any kind should be used.

The *bed-clothes* should be warm and light Fine cotton sheets and new blankets are best. A heavy cotton counterpane should never be used; it keeps in perspiration, and is not as warm, weight for weight, as a blanket. A light counterpane or a sheet can be used over the blankets; the latter gives the bed a neat and clean appearance. In some hospitals where the bed-clothes are changed on regular days, a clean sheet is first used as a counterpane, next change it is placed as top sheet, and finally it becomes the lower one.

An under-blanket need not be used except in winter, it should then be large enough to tuck in at both sides so as to keep it smooth. A wrinkled under-blanket often helps to cause bed-sores.

Except in acute rheumatism, sheets are better next the skin than blankets, as blankets become moist and act like poultices, and so may cause bed-sores. The feet should be kept warm, as little weight as possible being over the chest. It is well to remember that shiverings and complaints of chilliness may indicate feverishness, and do not always require additional bed-clothes or a hotter room. A hot-water bottle to the feet is often the best treatment.

## FURNISHING.

The *furniture* of a bed-room should be simple, and only just what is necessary, as useless articles collect dust, add to the trouble of cleaning the room, and are often in the way. All articles of furniture should be such as are easily and effectually cleaned.

Woollen materials hold smells and infectious particles longer than cotton or linen, and so should be as far as possible avoided. If the room looks bare without *window-curtains*, a bright pretty chintz or Nottingham lace may be used, but heavy woollen curtains should never be allowed. It is better not to use *bed-curtains*, as they prevent the air getting properly round the bed, and valances are also objectionable, as air should circulate freely *below* as well as above. *Carpets* should be used as little as possible in sick-rooms. They must never cover the whole floor, or go under the bed or any heavy article of furniture, as they ought to be

easily taken up when the room is being cleaned. A few strips are generally sufficient to deaden noise and to keep the room from having a look of discomfort.

The *bed* should be placed between the door and fire-place, that the air may pass over it, and so remove impurities. If the case be an infectious one, the nurse should always stand at the side next the door. By this means she will be in the fresh air, and avoid that which has passed over the sick-bed, and which may be contaminated with infectious particles.

If the room will not admit of this arrangement, the bed should stand between the fire-place and window. The nurse should then keep at the side next the window, as it is the best position for seeing the patient, and saves exposure to unnecessary risk of infection. If necessary, screens must be arranged to prevent any draught striking the bed.

Neither side of the bed should be against the wall, both for the sake of ventilation and for the convenience of the attendants. In some long-continued illnesses, such as fevers, it may be well to allow even the head of the bed to stand away from the wall, as the head of the bed is the easiest position from which to help a much-enfeebled patient to sit up, lie down, or turn over. Besides, it allows of very free circulation of air round the bed, and opens a passage by which the attendants may move rapidly and quietly from one side of the room to the other.

The foot of the bed should not be towards the window, as the light shining directly on the face of the patient is often a trouble.

It is very useful in prolonged illnesses to have a *second bed* in the room, on which the patient may be laid whilst

his own is being aired or changed. A long flat couch does nearly as well, as it may be made up to serve as a temporary bed.

In infectious cases the *chairs* should be plain wooden or cane-bottomed ones, without cushions, so that they may be wiped all over with disinfecting solutions. A comfortable chair and *foot-stool* should always be provided for any one who has to sit up at night.

A *wash-stand* on wheels is a great convenience, as it can be easily moved over to the bedside.

Some sort of *coal-box* will also be required. The coals ought, of course, never to be thrown on. An old pair of gloves may be kept for putting the coal on piece by piece, or, better still, the coal may be sent up in paper bags, and a bag can be put on cleanly and noiselessly when required. Turf is useful in the sick-room, it is noiseless and not liable to go out; it also has a pleasant and antiseptic smell.

A piece of wood makes a quiet and efficient *poker*.

There should be a good-sized *table* in the bed-room, and a smaller one beside the bed, covered with a clean cloth, for holding medicine bottles, &c.

When an invalid is able to sit up in bed, his meals may be given to him on a *bed-table*. This should be two feet long, one foot wide, and one foot high. It is placed across the bed, the legs resting on each side of it. If the front is slightly hollowed out, the table can be placed closer to the invalid's chest.

In infectious cases all wardrobes and chests of drawers for holding clothes should be removed from the sick-room.

The strictness with which the furniture of the room is arranged for illness must depend upon the nature of

Fig. 1.

Bronchitis or steam kettles (Figs. 1 and 2) are used to add moisture to the air. Fig. 1 is heated by a lamp, Fig. 2 is placed on the fire. In cases of croup, &c., sheets may be thrown over the bed so as to make it into a partially-closed tent, and the spout of the kettle introduced between them.—Of course, care must be taken to prevent the steam playing direct on the patient. Eucalyptus and other disinfectants may be added to the water in the kettle.

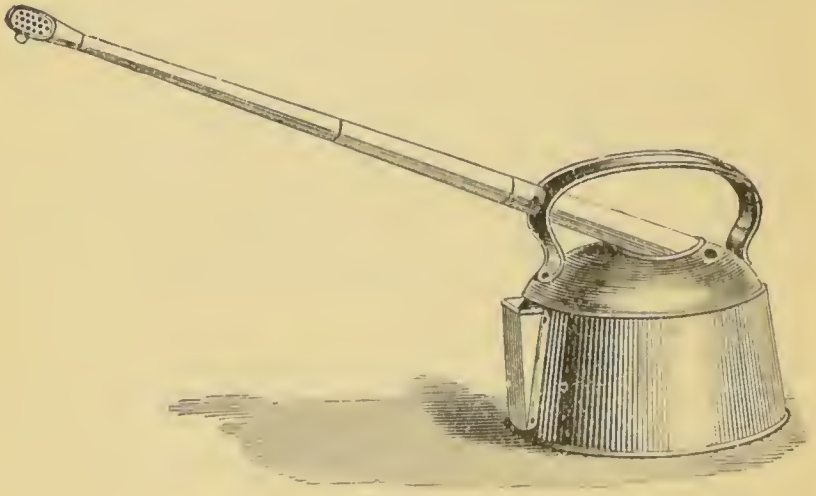


Fig. 2.

the complaint. In *infectious diseases* the articles mentioned above should be the only ones allowed. Anything that is unnecessary or easily injured is quite out of place, as *everything that has been in the sick-room will have to be thoroughly disinfected.*

### DECORATION OF THE SICK-ROOM.

Whilst everything in the sick-room should be light and easily cleaned, there is no necessity for ugliness, and all should be arranged with the object of soothing and interesting—but not fatiguing—the patient. A *picture* placed opposite the foot of the bed will occupy the patient's attention and supply him with thoughts; whilst a number of pictures scattered about the room might only tire him. Variety can be obtained by changing the picture every two or three days. Raphael's cartoons and similar sacred pictures will be generally found the best for this purpose.

The *patterns* of the wall-paper and window-curtains should be such as will not attract undue attention. Lying in bed day after day, especially if feverish, the mind will be active although the body be at rest, and the colours and shapes around will take on the appearance of other and generally disagreeable things. Watchers are often disturbed and worn out, soothing or combating illusions, and all because the wall-papers have ugly staring patterns. If flowing tapestry patterns in harmonious shades could be substituted for the hideous spotted patterns still so commonly seen in bed-rooms, delirium would often be milder and less difficult to soothe.

*Flowers*—cut or growing—always brighten a sick-room, and are quite harmless as long as they have not an

oppressive or sickening smell. A little Condy's fluid may be added with advantage to the water that flowers are placed in.

When a patient is *convalescing*, his bed should be placed where he can see out of the window, as anything will be of service that withdraws his attention from the sick-room and its contents.

## WARMING THE SICK-ROOM.

The *temperature of the sick-room* should never be allowed to go above 65 deg. F. or below 55 deg. F. Old people generally require the former temperature. The higher temperature is also required in croup and some diseases of the chest. In ordinary cases 60 deg. F. is as warm as a room should be. The heat should be maintained by means of a fire, and *not* by shutting out fresh air. Sick-rooms are often let get too warm in the evening and too cold in the early morning and forenoon.

It is well to remember that the coldest part of the twenty-four hours, and the time when the vital functions are at the lowest, is from 2 a.m. until sunrise. A hot bottle to the feet, an extra blanket, or a little warm milk or soup, is often of benefit about this time.

A *thermometer* must hang on the wall of the sick-room at the level of the patient, but not too close to the window or over the fire-place. It should be consulted frequently, and must be the guide by which the heating of the room is regulated. The nurse's own sensations are not to be depended on, as they cannot properly distinguish between hot and impure air.

## VENTILATING THE SICK-ROOM.

*Purity of air* is always a most important consideration in connection with in-door life, but in case of illness its importance cannot be over-rated. To sleep in a foul atmosphere is always bad, but the evil is somewhat neutralised by drinking in copious draughts of pure fresh air during the day-time, and by the fact that in ordinary bedrooms the air becomes changed whilst they are empty. In the sick-room, however, there is no change, the same conditions as to occupation exist day and night, the atmosphere is allowed no rest, continual calls for oxygen are being made, and no intervals are allowed for obtaining fresh stores. More air is also required in sickness than in health, owing to the different emanations from the body that require immediate dilution and speedy removal.

Whenever breathing is going on a supply of oxygen is continually taken in, and poisonous carbonic acid gas given off in its stead. To carry on the vital processes healthily there are therefore two things necessary:—that the carbonic acid should should be removed and oxygen supplied. These results are to be gained by ventilation, and no system of ventilation can be successful unless it accomplishes the two ends, the *removal of the used-up air*, and the *supply of fresh* in its place.

The necessity for more provision for *ventilation* than is commonly met with, will be seen from the following points. The average amount of carbonic acid in pure air is four parts in 10,000. In the air we expire there are 400 parts in 10,000. In the air of a room 150 parts in 10,000 may cause severe headache, whilst from 500 parts in 10,000 and upwards, the amount is sufficient

to produce fatal results. In a room where the carbonic acid is the result of breathing, much less will be poisonous, even 20 parts in 10,000 often causing giddiness and headache; this arises from the organic matters resulting from respiration, &c., and from the fact that the oxygen (which can neutralise the carbonic acid if increased equally with it) is partly used up.

During the twenty-four hours about sixteen cubic feet of carbonic acid gas are given off into the air by each person, and a corresponding amount of oxygen is absorbed. To keep the air in a condition of practical purity, with not more than say six parts of carbonic acid in 10,000, it has been calculated that 3,000 cubic feet of fresh air should be supplied per hour for each person. In illness more will be required, and additional air will be needed to feed artificial lights, each cubic foot of coal gas that is burned giving off two cubic feet of carbonic acid, and so each gas light defiling the air as much as several people would.

Suppose there is one person in a room which holds 3,000 cubic feet of air (one, for instance, 17 feet long, 14 feet wide, and 12 feet high), it will be apparent that to keep the air pure it should be entirely changed once in each hour; whilst if the room contained only 1,500 feet it would have to be changed twice; if 1,000, three times, and so on. It is found by experience that the air of a room cannot be changed more than three or four times an hour in a cold country, such as ours, without causing a perceptible draught, so that *each* person should have at least 1,000 cubic feet of space, even when the ventilation is perfect.

The size of the *inlet* is of great importance, although it is so often neglected, the inlets to ordinary rooms

being generally the crevices round the windows and doors—especially the latter. The *rapidity* with which air enters must depend upon the size of the inlets; should they be large it can enter slowly, but should they be small the air must rush in rapidly, in order to be in sufficient quantity. Upon the speed with which air enters—and consequently upon the size of the apertures—depends in a great measure the presence of absence of a draught. At ordinary temperatures, as soon as air moves faster than three or four feet a second, it gives the sensation of draught, and cold air moving even slower will have the same effect.

If the air is allowed to enter *directly* towards the occupants of the room, the size of the inlets would need to be twenty-four square inches for each person. If the air is directed upwards it may be let enter more quickly, and so a smaller area of aperture will do. It is well to remember that the smaller the entrances for air are the more rapidly it has to enter, and that the more rapidly it enters the more sensation of draught there is. Thus a draught caused by air entering through a limited space, such as the chink under a door, may often be cured by making a larger opening, as by letting down the upper window sash.

To perfectly ventilate a room is by no means an easy task, but it is not an impossible one, and a fair share of success can be obtained with but little trouble.

There are three great means by which *ventilation* is carried on.

I. *Diffusion*. Where two gases come in contact they have a natural tendency to mix. By diffusion the products of respiration are borne away from the vicinity of our mouths. The bad air we breathe comes in con-

tact with the outer air, and the more different the two are the more rapidly they mix. By diffusion the bad air of a room will change places with the air in the lobby, if the door be open. Air also diffuses to a considerable extent through the crevices of both doors and windows, and through the chimneys. Air can also diffuse through an ordinary brick and plaster wall.

II. *Winds.* The wind blowing against a window forces its way in through the crevices, or passing over a chimney-top sucks the air up the chimney.

III. *The difference in weight between hot and cold air.* This is the most important force to consider, for it is by taking advantage of it that success in ventilation is to be attained.

*Air on being heated expands*, and consequently becomes *lighter*, bulk for bulk, than it was before, decreasing again on cooling. Carbonic acid gas is heavier than ordinary air. It will be understood from these two facts that since air, when expired, is nearly at the temperature of the human body—98 deg. F.—on being breathed it will first rise up, but that when cooled it will fall, owing to the carbonic acid it contains. Therefore, *if respired air can be carried off at once it can be best done from above*, but if, as is generally the case, the ventilation is not perfect enough to admit of this, it must be done from below. The removal of foul air immediately *from above* is accomplished in buildings lit by a "sunlight." The air heated by the combustion of the gas escapes through a tube above the burners, and in doing so causes a current, the result of which is that the air in the upper part of the building is sucked out. Thus the foul breathed air is disposed of before it has time to cool and fall. This can be done in a sitting-room by

having perforations in the ceiling over the chandelier; the burnt air will find its way into the space between the ceiling and the floor of the room above, from this it will escape through a perforated brick or plate of zinc let into the outer wall.

In ordinary cases the foul air must be removed *from below*, and the best and most convenient channel for doing so is the chimney. An *open chimney* may be looked upon as a necessity for the sick-room. That it is *open* must be seen by the nurse, for unfortunately the majority of bed-room chimneys are anything but open People display great ingenuity in stuffing them up, and their contents are almost as varied as though they were pawn-shops—newspapers, band-boxes, old boots, birds'-nests, straw, and boards, having often to be removed before the passage of air is secured. Sometimes it is only necessary to open the register. The state of the chimney should be one of the first points noted in the sick-room.

The usefulness of the chimney as an *outlet* for emoving bad air depends upon the fact that heated air is lighter than cold. A chimney contains a column of air. When a fire is lighted the lower part of this column becomes heated, and consequently lighter; it therefore ascends, passing up the chimney and out at the top. Its place below is taken by fresh air, which in turn is burned or heated, and passes up. Thus a continual stream of air passes from the bottom of the chimney to the top. If fresh air be admitted to the room in sufficient quantities through the door or window, there will only be the one current in the chimney; but if the other apertures be closed, there will be a *down* draught at the sides of the chimney, as well as an *up* draught

in the centre. The reason of this is plain. When air leaves the room its place must be taken by more, and if no other way is open it must enter by the chimney. The presence of this *down* draught can be recognised by its discharging occasional puffs of smoke into the room; it can generally be cured by opening the top of the window.

Even when there is no fire, a chimney acts as a ventilator. The air in a room is generally warmer than the air outside, and so the air in the fireplace passes up and out. The current will, however, not be so strong as if a fire were lighted.

The removal of air by a chimney is hindered if the outside atmosphere is heavy and damp, and so passes down the chimney by its weight. This can be best overcome by a good fire, which will thoroughly heat the column of air, and establish a strong *up* draught.

The best *inlet* is the window. The door opens off a passage or staircase that communicates with the lower parts of the house, and so cannot be depended upon as an inlet for *pure air*. Indeed, in some cases the various fires throughout a house have been found to draw such a current of air from the basement that even the air in the sewers has been drawn in past the traps.

The bottom of the window does not as a rule make a good inlet; the air passes directly across to the chimney, and so causes a draught. The *top of the window* may generally be used, as it is free from this disadvantage, and, unless in very special circumstances, it should never be entirely closed day or night all the year round.

Sometimes, as in windy weather, or in small rooms where the bed has to be placed between the window and the fireplace, opening the top of the window causes a

draught. This arises from the air falling directly on the invalid, and can be remedied by breaking the draught up, or by directing it upwards. Wire gauze (which must be frequently cleaned, or it will become clogged) over the open part of the window, or an ordinary window-blind, will break up the current. Ordinary gauze may be strained over the open part, it will not only break the draught, but will retain dust and damp. It must be frequently washed. The same effect is got by letting the air through perforated panes of glass. The openings in the latter are, however, too small, and are not fit to take the place of the open window.

The current can be directed upwards by many means. In churches windows are often made to open by falling inwards, thus directing the air towards the ceiling. If the lower sash be opened a little way, and the opening covered with a board, a space will be left between the sashes, through which fresh air will enter with an upward movement. (*See* Fig. 3.) A curtain or screen can generally be arranged so as to check a draught. It may happen that opening the window wider will stop the draught.

One great reason why the ventilation of sick-rooms is so imperfect is because many people confuse warming and ventilation. It is necessary to distinguish them carefully. When the temperature, as shown by the thermometer, rises too high, the fire should be let get lower; when the air becomes at all foul and stifling, the window should be opened, and fresh air let in. Generally when the air becomes close just the reverse is done—the room is said to be too warm, and the fire is allowed to go out. By this no good is done, but rather harm, for the fire would have removed some portion of the

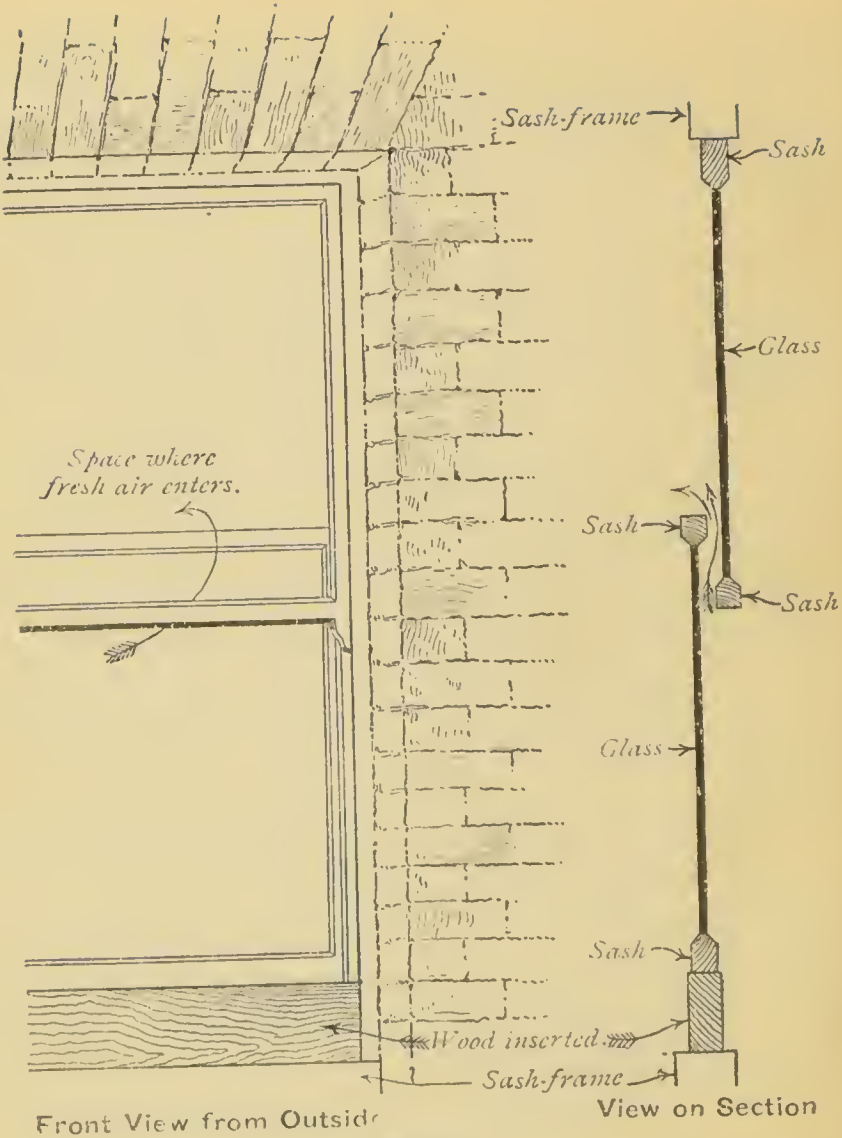

Sash-frame
Sash
Glass
Space where
fresh air enters.
Sash
Sash
Glass
Sash
Wood inserted
Sash-frame
Front View from Outside
View on Section

FIG. 3.

breathed air, instead of which it is allowed to accumulate. The right thing would be to open the window and let in fresh air to dilute and take the place of the carbonic acid, and to force it up the chimney.

The best test for the ventilation of a room is to enter it from the fresh air, and to notice if it seems close or stuffy. If it does, it is either over-heated, or not properly ventilated: if the thermometer is not too high the latter is the case, and means should be taken to improve the ventilation, either by increasing the inlet for good air or the outlet for bad, and by removing anything offensive from the room. It must be remembered that *to purify the air it is not necessary to chill the patient.*

Many people have a prejudice against admitting night air into their rooms. This arises from its being colder, and so more perceptible. It is, however, only a prejudice. Night air is not injurious, except in water-logged soils, where miasmas may rise, and in some cases it is even purer than day air.

# CHAPTER III.

## INFECTION AND DISINFECTION.

### CONTAGION AND INFECTION.

The word *contagion* was formerly restricted to the communication of a disease to the healthy by direct contact with the diseased part, whilst *infection* was used to denote the communication of diseases by means of the excretions or exhalations from the body. At the present time the two words are used indiscriminately in either of the above senses.

Most diseases have a tendency to occur in "outbreaks"—that is to say, a number of cases are met with at the same time and in the same place. Sometimes this arises from general causes, such as the time of year, the variations in temperature, the peculiarities of locality; but in other cases the disease spreads directly, or through some medium, from person to person; so that in some illnesses there is a common cause for all the cases, whilst in others one case is the cause of more. The latter class are said to spread by contagion or infection.

Infection spreads in many ways. In some cases it is necessary for the substance in which the poison resides to be brought into close relation with capillary vessels in the tissues in order that immediate absorption may take

place. This occurs easily in the eye, where the vessels in the mucous membrane quickly absorb infectious particles. In the skin, however, it is generally necessary for the epidermis, or outer horny layer, to be broken or destroyed, in order that the matter may reach the vessels beneath.

In other cases the poison passes off into the air, and may be inhaled, swallowed, or pass into the pores of the skin. The poison may also get attached to the wall-paper, furniture, clothes, &c., and so may be the means of originating its particular disease, even after considerable periods. All articles to which the poison may become attached are called "*fomites*." Drinking-water and milk are often mediums for conveying the poisons of cholera and typhoid fever, in consequence of the excreta contaminating them. Water that has stood in the sick-room may become contaminated by absorbing the particles in the air, and may be the means of giving the disease to others. Water in cisterns is liable to contamination if the overflow-pipe opens directly into a drain, as gases may pass up and be absorbed.

### DIVISIONS OF FEVERS.

*Fevers* may be divided into Endemic, Epidemic, and Sporadic.

*Endemic* (deriv., among the people) is applied to any disease that is restricted within certain limits of locality, and seems incapable of being communicated beyond them, *e.g.*, *ague*.

*Epidemic* (deriv., upon the people) is applied to any disease that attacks a number of people together, and also travels from place to place, *e.g.*, *scarlatina*.

*Sporadic* (deriv., scattered) is applied to diseases which occur in isolated cases.

The same disease may sometimes appear in one of the above classes, and sometimes in another. Thus *typhus* may occur sporadically, affecting a few scattered here and there, or it may rage endemically in the poor part of a large town, or it may spread epidemically in all directions.

*Fevers* are also divided into *Idiopathic*—those in which the feverish symptoms are the one important leading feature—and *Symptomatic*, where the fever is only a symptom occurring in the course of some other disease, *e.g.*, inflammation of the lungs.

The word *Zymotic* is now used in a much wider sense than its derivation from the Greek word for a *ferment* would imply. It includes all those diseases which are "preventible," and the continued existence of which is a reproach to our civilisation.

Another very convenient division of *fevers* is into eruptive and continued. The *eruptive* are those in which the climax of the disease is the appearance of the eruption, *e.g.*, *scarlatina*, *measles*. The *continued* are those in which the rash seems to have no effect on the disease, which continues in spite of its appearance, *e.g.*, *typhoid*, *typhus*.

### STAGES OF FEVER.

The course of a fever case may be conveniently divided into certain stages: I. *Incubation*. The period that elapses between taking the infection and the development of the disease. This period varies greatly in different diseases, and even in different cases of the same disease. II. *Invasion*. Dating from the actual beginning

of the attack. The rise in temperature generally begins with the commencement of this stage. III. *Eruption.* Dating from the appearance of the rash. This is sometimes—but rarely—wanting; the absence of rash is often a dangerous symptom. IV. *Defervescence.* The period during which the temperature falls to normal. V. *Convalescence.*

### WHAT HAPPENS IN FEVER.

The fever poison enters the blood and multiplies there; it more or less paralyses the nervous system, and so suspends its power of regulating the vital processes. The heart, being relieved from control, beats more rapidly; the power of assimilating fresh material is lessened; the tissues of the body are consumed; the body wastes; the used-up materials are not removed from the body, but circulate in the blood, giving rise to head symptoms and local inflammations. These actions may go on increasing in intensity until they are incompatible with life, or the poison may become weakened, and the body gradually shake off the morbid conditions and resume its healthy actions.

### COURSE OF FEVER CASES.

After the infection is taken, but before the fever actually commences, there is an *incubation* stage which is generally marked by a train of premonitory symptoms, simple of themselves, but significant when occurring together, and when gradually increasing in intensity. The patient is listless, unwilling to make mental or bodily exertion, he loses his appetite, feels slight and occasionally causeless pains, is drowsy by day and restless at night, his sleep being broken and unrefreshing.

Then comes the *invasion* of the attaek. This may be only marked by a gradual increase of the premonitory symptoms, or it may be sudden and sharp. In the one ease the patient gradually becomes unable to go about, in the other he ehanges almost in a moment from eomparative health to severe disease. As a rule, the beginning of the attack is marked by some distinctive symptoms, strong shiverings (*rigors*) being the commonest. Severe headache (especially across the forehead) is another eommon symptom. The temperature soon rises, and thirst eomes on, the tongue being clammy, dry, and furred. The pulse also becomes quiek, and prostration inereases. Then the *eruption* appears, and in continued fevers the symptoms increase in severity; the temperature rises higher, the pulse becomes faster and perhaps weaker, prostration increases, the furring on the tongue spreads, the teeth become diseoloured, the mind becomes affected, first at night, but then both day and night, though still most marked by night; there may be giddiness and deafness; there may be restlessness, or the patient may lie in an apathetie state with half-closed eyes.

If the result is to be reeovery, there is now a change for the better, and *defervescence*, or the return to normal temperature, begins. Sometimes the temperature falls suddenly, this is ealled *crisis*; sometimes it deelines slowly, this is ealled *lysis*.

*Convalescence* lasts until a normal state of health is regained.

### SPECIAL POINTS CONCERNING INDIVIDUAL FEVERS.

Typhus. *Infectious* through the exhalations from skin and lungs; *incubation*, about nine days; *invasion*,

gradual or sudden; *delirium* begins towards the end of the first week; *eruption*, mulberry spots and a mottling, the latter seen, as it were, *through* the skin, it appears about the fourth day, and disappears at the end of the second or third week; *temperature* seldom goes above 106° F.; it is continuous until defervescence; *complications*, affections of the heart or lungs; *defervescence*, by rapid crisis; *quarantine*, from end of first week until convalescence is complete. *Special precautions*—to avoid the patient's breath, and to keep the head turned away when moving the bed-clothes; free ventilation.

Typhoid. *Infectious* through excreta; *incubation*, probably one to two weeks; *invasion*, very gradual; *delirium*, from end of second week; *eruption*, small raised, rose-coloured spots, coming out in several crops, appears in the middle of the second week, and lasts a fortnight, may be absent in children; *temperature*, generally lower in the morning than at night; *complications*, inflammation of the bowels and lungs; *defervescence*, slowly by lysis; *quarantine*, danger through the excreta from almost the beginning of the attack until convalescence is completed. *Special precautions*—to disinfect all vessels before and after receiving the excreta, to empty them at once, and to copiously disinfect the place where they are emptied; not to give meat until the doctor orders it; not to give purgatives.

Scarlatina (Scarlet fever). *Infectious* through scales from skin, and probably from breath; *incubation*, generally five or six days; *invasion*, well-marked; *delirium*, may be a little at night; *eruption*, appears on second day, bright red points that spread and join:

*temperature* runs high; *complications*, kidneys, throat, rheumatism, abscesses; *defervescence*, generally rapid; *quarantine*, until the skin has quite *peeled*. *Special precautions:* to thoroughly disinfect everything to which the scales of the skin might stick; to protect the patient from cold; to rub the skin morning and night with carbolic oil.

Measles.—*Infectious* through exhalations; *incubation*, about a week; *invasion*, sudden; *eruption*, yellowish-red, appears on the fourth day; *temperature*, up to 103° F.; *complications*, diseases of the lungs; *defervescence*, by rapid crisis; *quarantine*, chiefly whilst eruption is out. *Special precautions:* to protect the chest, keep the room about 60° F., and if the air is dry to introduce steam into the room.

Rötheln.—In this disease the characters of measles and scarlatina are combined, sometimes one predominating and sometimes the other.

Small-Pox.—*Infectious* by exhalations, &c., from lungs and skin; *incubation*, nearly a fortnight; *invasion*, sudden; *delirium*, may begin almost at once; *eruption*, appears on the third or fourth day in spots, they enlarge, become like a small blister, a depression forms on the top, the contents turn into "matter," they break, or dry into a scab, which falls off, about the end of the second week; *temperature*, high at the beginning, and again when the "matter" is forming; *complications*, lungs, parts affected by rash, as skin, eyes, &c.; *defervescence*, gradual; *quarantine*, from the first appearance of the attack until some time after the disappearance of the rash; the greatest danger is when the "matter" is formed in the pocks. *Special precautions:* all attendants should be re-vaccinated.

VACCINATION.—The natural course of vaccination is that on the fourth day a red pimple appears, turning on the fifth day into a blister (vesicle). On the eighth day a red inflamed ring forms round it; by the tenth or eleventh day it is depressed in the centre. The ring then gradually fades, and about the nineteenth day the scab falls off.

DIPHTHERIA.—*Infectious* through deposit on throat and through breath; *invasion*, gradual; *special seat of attack*, the air-passages; the walls become inflamed, and a deposit forms on and in them; *quarantine*, for some time after convalescence. *Special precautions:* to wipe away all secretions from the nose or mouth with pieces of rag, and to burn the rags immediately; to keep away from the patient's breath, especially when he is coughing; to disinfect the room and everything in it. Injection with anti-diphtheric serum, if used early enough, greatly increases the percentage of recoveries; so in all suspicious cases medical aid should at once be sought.

## DISINFECTANTS.

*Asepsis* means freedom from poisons or microbes—perfect cleanliness.

*Disinfectants* may be divided into three classes:

CLASS I.—*Those which attack impurities in the air.*

*Sulphurous Acid Gas*, got from the fumes of burning sulphur, unequalled in convenience and efficiency for unoccupied rooms. The Local Government Board advise 1½lbs. of sulphur to be burned for each 1,000 cubic feet of space. The sulphur can be used in the form of "candles," or the sulphurous acid gas can be procured compressed in cylinders.

*Formalin* is also used for the same purpose, the vapour being given off by the heat of a lamp.

*Chlorine Gas,* got from moistened chloride of lime. As the gas is heavy, the lime should be placed high up.

CLASS II.—*Chemical agents for acting on the diseased body or the infectious discharge therefrom.*

For use in and about the sick-room the best disinfectants are Creolin (known also as Jeyes' Fluid) and Izal; both of these are derived from coal, and have been proved to be valuable and reliable disinfectants. As they are nearly non-poisonous and free from unpleasant smell, they may safely be used in and about the sick-room. A strong solution (a tablespoonful to a pint of water) should be placed in vessels to receive excreta. A weak solution (3 or 4 tablespoonfuls to a gallon of water) may be used for wiping furniture, flushing drains, &c.

*Lysol* (a combination of creolin and liquid soap) can be added to the water with which a patient is sponged.

*Corrosive Sublimate* is a valuable disinfectant, but very poisonous, and acts injuriously on metals. It is used in solution of the strength of one part to 1,000 or 2,000 of water. Convenient tablets are sold, one of which, added to a pint of water, makes a solution of one in 1,000. Aniline blue is added to corrosive sublimate to give it a distinguishing colour.

*Carbolic Acid* also is useful, but poisonous. A solution of one part to 60 of water, or one part to 30 of oil, may be used. The former for receiving excretions and for flushing; the latter for applying as a dressing.

*Chlorinated Lime* is very useful for flushing drains, especially if foul. A large quantity of a solution containing from one to two ounces in each gallon of water should be used.

*Permanganate of Potash* (Condy's Fluid). An ounce of the Permanganate added to three pints of water makes a solution of the same strength as Condy's Fluid. This is a safe, but not a powerful disinfectant.

*Clay.* Substances covered with dry clay, or buried, are harmless, as long as they are not near a well or source of water supply.

CLASS III.—*Cold, Heat, Air, and Sunlight.*

*Cold* is a great natural disinfectant, but can hardly be used artificially.

*Heat.* Boiling is the best means of disinfecting bed-clothes, clothing, &c. Bedding may be disinfected in a disinfecting chamber, by dry heat or by superheated steam; the latter is by far the best.

*Air.* Fresh air, abundantly supplied, so dilutes and oxidises infective matter as to destroy most microbes. The infective matter of typhus, for example, is rapidly killed.

*Sunlight.* Exposure to sunlight is fatal to many microbes; even such hardy forms as the tubercle bacilli die after a few hours' exposure.

USING DISINFECTANTS.

I.—*During illness.* During an infectious illness only the necessary furniture should be allowed in the sick-room, and it should be cut off from the rest of the house by nailing a sheet, kept moistened with Creolin or Izal solution, over the door. The wood-work of the room should be cleaned with a cloth wrung out of disinfectant solution. All clothes—bed and personal—should be dipped in disinfectant solution. All cotton used for wiping up infected discharges, &c., should be previously wrung out of Condy's Fluid, and, as soon as they are used, be burned.

*In Scarlatina.* During convalescence the patient should be well bathed, and the skin may be rubbed over with Carbolic Suet (one part in 60) or Izal Cream. The clothes must be soaked in disinfected solution and then boiled. They must never be sent to a public laundry.

*In Typhoid.* The excreta are the agents of infection. They must be received into vessels containing Creolin or Izal solution, and immediately covered up, and removed from the room. Typhoid excreta should be buried, or, if emptied into the drains, the drains should be subsequently well flushed with disinfectants.

II.—*After illness.* The patient should be well bathed, dressed in clean clothes, and removed from the room. All bed-clothes, clothes, etc., should, if possible, be sent to a disinfecting chamber, where they may be exposed to a high temperature. The room should then be disinfected. The wall-paper should be soaked with carbolic acid solution, stripped off, and burned. The articles of furniture should be arranged apart from one another, and the bedding and other articles arranged upon them. The crevices of the window and the chimney should be closed up. A bucket of water should then be placed in the middle of the room, and an old iron dish containing from half to one pound of sulphur should be supported over it by a pair of tongs; or else a couple of bricks may be put in the water, and the tray of sulphur placed on them. (Sulphur candles can be bought, which are convenient and safe in use.) Some hot coals are then to be placed on the sulphur, or spirits of wine may be poured over it and ignited, and the door is to be closed. In twenty-four hours the room may be entered cautiously and the windows and chimney opened. When the room is well aired the ceiling and walls should be

whitewashed, and the floor and furniture should be washed with carbolic acid solution, and soft soap.

If time is not of much moment, it is best first to burn sulphur in the room immediately after the invalid is removed, and before anything is disturbed; and then next day to arrange the contents of the room as described, and to burn sulphur for the second time. This lessens the risk run by the person who is managing the disinfecting.

## POINTS TO BE NOTICED IN INFECTIOUS CASES.

Whether the patient has been exposed to infection. The length of incubation. The exact date of the first rigor. The nature of the *invasion*. The symptoms and when they began. The temperature. The pulse. The respirations. Whether there is a rash, and, if so, where, and of what nature.

# CHAPTER IV.

## DETAILS OF NURSING.

### THE NURSE.

In speaking of "home nursing," it is unnecessary to say much about the *choice* and *qualifications* of a nurse; for although no one should take up nursing as a profession without careful thought, and unless she feels sure she will be able to devote herself heart and mind to the work, all should know something of the rudiments of nursing, and should be prepared to fulfil the duties of a nurse should occasion arise. We never know at what moment accident or sudden illness may lay a loved one helpless, and so should be ever prepared. Occasions may arise when even those who most dislike the idea of nursing will long to be proficient, and will suffer deeply at seeing what ought to be their places filled by others—less dear, but more skilful.

Some persons would never make good nurses, and so should not adopt nursing as a profession. Good intentions alone are not sufficient to justify people in becoming regular nurses, for with the best intentions it is quite possible to utterly fail. Still, knowledge cannot make people less fitted to be nurses, and a little knowledge has often, with the aid of love and sorrow, formed good nurses out of those who had seemed utterly unfit for the calling.

Amongst those who may be well-meaning, but yet make *bad nurses*, we find many classes. For instance:—

*The noisy.* These, although they may be kind and loving, are yet continual sources of disturbance to the sick. They wear creaking boots or else thump along on their heels, they slam doors, rattle cups, knock over bottles, sneeze loudly, poke the fire, and add coals in the noisiest manner, and altogether keep the unfortunate patient in a state of nervous expectancy, wondering when the next crash will occur.

There is also an *ostentatiously quiet* class, who keep the patient quiet with the effect of making the quiet as injurious as noise. These steal about on tip-toe with finger on lip, and continually murmuring, "Hush—h—sh!" Everything is whispered, and the senses of the patient are kept at full tension, trying to find out what is going on. The cat-like step also keeps the patient continually wondering in what part of the room the nurse will turn up next. Such as these should remember the useful sick-room aphorism: "To speak low is better than to whisper loud."

Another class is *the fussy.* Nothing is too troublesome to do, yet everything is made a trouble of. What might be arranged without a word, is made the cause of many; what might be done slowly and quietly, or even omitted, is hurried into prominence; and of course the patient suffers. Continual inquiries as to how a headache is, continual shifting of pillows when the only desire is to be left alone, repeated visits on tip-toe to see if asleep, when what is wanted is to be let fall asleep in quiet; all these may be well meant, but are injurious.

Perfection in a nurse is like perfection in a woman's attire—no detail should be obtrusive, but the effect

of the whole should be a feeling of its perfect fitness and harmony.

The duties of a nurse are numerous and varied, and of course chiefly depend upon the nature and surroundings of the case; it will be only possible to give some general hints here.

A nurse must always obey orders. No matter how accomplished or skilful she may be, no matter how great or varied her experience, she is not a doctor, and she can best display her knowledge and exercise her skill by faithfully carrying out the directions she has received. The best-qualified nurse receives a very different training from what a medical man does, and many signs and symptoms which he perceives will be hidden from her. His experience will also enable him to learn more from even the commonest symptom. It is no excuse for a nurse not to carry out directions because they are not what she would expect; there are exceptions to all things, and a remedy which would be injurious in the majority of a particular class of cases, may be of great use in exceptional ones. The doctor, and not the nurse, is the judge as to what cases are exceptional. If the nurse has doubts she ought to speak to the medical man, but on no account should she receive orders from him in silence, and when he is gone refuse to obey them.

The nurse should never hide anything from the doctor. Even if she has done wrong, and is afraid of blame, she must be perfectly open. Secrecy is only adding one fault to another, and it is a serious thing to think that life should be risked in order to conceal wrong-doing. It is far better to tell too much than too little. The doctor can separate the grain from the chaff, but he often can-

not supply the place of what is withheld. She need never be afraid of troubling him; he will always be glad to hear anything that may help in the diagnosis or treatment of a case. An apparently insignificant change may herald a relapse or an attack of some dangerous malady, and if duly reported will enable immediate measures to be taken to check it; but if, owing to the carelessness or reserve of a nurse, an insidious disease is allowed to run on for some time undetected, no amount of skill may be able to undo the evil.

If the nurse has any suggestions or objections to make, she must make them to the doctor. In the few minutes a medical man can spend with each patient it is impossible for him to think of everything. The nurse should make a note of all points on which she needs information, and instead of saying, "The doctor didn't tell me what to do about this or that," should ask full directions from him before he leaves.

The nurse should avoid setting herself in even apparent opposition to the doctor, and must always uphold his authority. It is wicked and silly to attempt to increase her influence with a patient or his friends by seeking to undermine the influence of the doctor. A medical man and nurse in charge of a case should each be respected and trusted in their proper spheres, and should strive to assist each other and maintain each other's position. Their interests, instead of being antagonistic, are practically identical. Also to shake a patient's faith in those around him is to increase his nervousness and distress of mind, and consequently to lessen the chances of his recovery.

The nurse must never let anything offensive remain in the sick-room, but must remove *all* excreta *at once*.

Food should not be left in the sick-room, but brought in fresh when it is wanted, and removed when left. The nurse must neither take, nor allow any one else to take, food which has been left in an infected room. She must not let a patient drink water which has stood long in the room, for water rapidly absorbs poisonous matter from the air. She must attend carefully to the heating and ventilation of the room, not confounding hot and foul air, but opening the window when the air needs renewing (taking precautions to prevent the patient feeling a draught), and keeping a lesser fire when the air is too warm. She must watch the thermometer, and see that the temperature does not rise or fall outside the proper limits. She must see that everything about the room, including the bedding, is kept perfectly clean. She must see that all preparations are made for the visit of the medical man.

In infectious cases it is the nurse's special business to see that none of the rules adopted to prevent the spread of the disease are transgressed.

In her conduct towards a patient, a nurse must remember that his recovery is the great object to be attained, and so, when necessary, should sacrifice her personal feelings and comfort to promote that end. She must take care of her own health, but in every other way give herself up for the good of the patient. In critical cases it is sometimes even necessary to risk her own life for the sake of others. In infectious cases this is of course always done.

In good nursing there is no *minimum*. When the nurse has done what at first sight appears to be her whole duty, she will always find plenty of ways in which she can be useful, and it is generally these extra

little attentions that patients most value. Regular bed-making and washing are often looked upon merely as acts of duty, whilst having the pillows unexpectedly arranged, or the hot hands sponged, gives pleasure and calls forth gratitude.

A nurse must act firmly, but never unkindly. She must not impose unnecessary restrictions, and should explain the reason for necessary ones. She must win her patients' confidence, and make them trust her, and then she will easily get her own way. She must try and never deceive a patient. It is hard to win trust, but easy to lose it, and once a person is deceived the possibility of further deception will be always before the mind, and, instead of being trusted, the nurse will experience loss of faith, and with the loss of faith the recovery of the patient may be retarded.

She must be gentle. A nurse should never give the slightest unnecessary pain in order to save herself trouble. She must be patient. No matter how trying or vexatious an invalid may be, no matter what his want of gratitude, she must remember that he is ill, and so never be tempted to a single angry word, look, or gesture. She must be sympathetic, and not attempt to cheer patients by telling them there many are others far worse. This is no comfort, but is often irritating. At the same time she should never speak despondingly, or magnify the dangers of a case, or tell of the wonderful and serious cases she has seen. If her experience furnishes anything bright or cheerful, let her tell *that*, but the relation of horrors is dangerous and inexcusable.

A nurse must be always modest, but never prudish. If she remembers how high and holy the vocation of a nurse is (and it is a vocation, whether adopted for a life-

time or during a single illness), if she is absorbed in her work, and really anxious for the welfare of those under her care, she will be able to do many things for them from which in other circumstances she might shrink; for many things which would otherwise be repugnant are in serious illness done as mere matters of routine. But all this can be done without the slightest loss of modesty. Modesty of mind and modesty of speech should never be lost. No matter what a nurse's experience, no matter what she has done, what she has learned, she should always be careful in conversation; what may be commonplace to her may not be so to some, and neither she nor her patients can derive benefit from shocking others.

Great self-control is necessary, and a determination to accept all the duties of her calling with patience and good temper. Intelligence and knowledge are also requisite. To be a good nurse, all domestic duties must be thoroughly understood, not necessarily to do them, but to ensure that they are properly done.

A nurse's duty towards her patients might be shortly summed up in the words, she must be natural, and do as she would be done by.

## THE NURSE'S DRESS.

The *nurse's dress* should be such as not to interfere with her duties. All extra frills and adornments which are likely to be in the way had better be omitted. Washing fabrics are best. All rustling or otherwise noisy materials are out of place. The under-linen should be changed frequently.

*Dresses.* Unbleached Irish or brown holland should be

used for infectious cases, also for summer wear in general cases. They should be made quite plain, with the skirt not long enough to be trodden on. In winter navy blue or grey serge may be used, made in the same way.

*Aprons.* Strong white calico, reaching nearly to the bottom of the dress and stretching well round behind, though not quite meeting. A bib should be added to cover the front of the dress. Pockets may be added; in nursing surgical cases they are indispensable.

*Boots and Shoes.* They should be moderately thick, as far as is consistent with quietness. Patients as a rule do not like a cat-like tread, and so a gentle footstep is sufficient, except in cases where it is important not to disturb sleep. High heels should be positively excluded from sick-rooms, and elastic sides should be avoided, particularly when sitting up at night, as they cause the feet to swell.

*Caps.* A clean white cap of clear muslin has a fresh and pleasant appearance, and keeps dust from the hair.

*Collars and Cuffs.* Plain, neat-fitting white linen are the most suitable.

*Ornaments* are quite out of place on a nurse, though a bright ribbon bow may be worn at the throat to give variety.

A *pin-cushion* and *pair of scissors* hung at the side will be useful.

## MANAGEMENT OF NURSE'S OWN HEALTH.

The preservation of a nurse's health is of the utmost importance. Without a fair share of health and strength it is impossible to stand the bodily exertion and wearing mental anxiety that are inseparable from her vocation.

The fact that a nurse has to do many things which are far from pleasant or agreeable, especially to refined and cultivated women, increases the risk of breaking down. All these disadvantages having to be borne for the seven days of the week, and often by night as well as by day, makes it still more needful for a nurse to attend carefully to her own health and to do all she can to preserve it.

Regular exercise in the open air is necessary, a walk of half-an-hour's duration once a day is the *minimum* allowance. A few minutes spent in the open air every morning and evening is of great advantage.

A nurse's food should be nourishing and light, and her meals should be taken regularly, out of the patient's sight and away from the sick-room. The state of the bowels must be carefully attended to. She should avoid constipation, but yet not resort to strong aperients. Any tendency to diarrhœa should be at once treated under medical advice. In case soreness of throat occurs these precautions must be carried out strictly; tonics and nourishing soups will also be advisable.

Every nurse should wash the whole surface of her body, except the head and hair, once in the twenty-four hours. This is best done in cold water, as it stimulates the system and lessens the liability to feel changes of temperature. A warm soap bath should be taken at least once a week. The hair should be kept well brushed. The action of the brush on the skin often cures headaches of rheumatic, or even nervous origin.

The teeth should be well brushed twice a day, or better still, after each meal; this removes the smell of food from the nurse's breath, and so relieves the patient of a possible source of annoyance.

A nurse should sleep in a room with plenty of air. If called at night she must put on a warm dressing-gown and slippers. She should carefully examine her hands for cuts or cracks, covering any found with sticking-plaster before dressing a sore. She should never put her hand near her eyes while engaged in dressing a case. She should never use a patient's towel, and should avoid, as far as possible, inhaling his breath or any effluvia.

### REGULATION OF VISITORS.

In a severe case of illness restrictions must be put upon visitors. The nurse must attend to this under the directions of the medical man. If the disease be an infectious one, the fewer visitors that are allowed the better, and it will be the nurse's duty to minimise the risk of infection as far as possible. Visitors should be placed between the window and the bed, but not between the bed and the fireplace. They should not go into the room fasting. In diphtheria, etc., they should not be allowed to risk contact with the patient's breath. In scarlatina, when the skin is peeling, they should be dissuaded from touching the patient. In typhoid special precautions should be taken about the excreta. Before leaving the room or ante-room the visitors should be advised to wash their hands with carbolic or other antiseptic soap.

In cases of ordinary illness (putting the question of business visits aside, as these must to a great extent be controlled by the patient and his friends), the rule for regulating visitors must be that they shall only be allowed to come as often, to stay as long, and to choose

such times, as shall not be injurious to the patient. The welfare of the patient must be the great point insisted upon, and claims of relationship or friendship must be subordinate to this.

A visitor should not be ushered in suddenly, especially if the meeting is likely to cause emotion, at the same time there should be no unnecessary delay; the visitor should be ready to enter the room as soon as the nurse has announced his coming. Expectant waiting is sometimes as upsetting as a shock.

The visitor should sit in full view, so that the patient can converse without having to screw his head round on the pillow. He must never sit or lean on the bed, all dislike shakes or jars, especially when ill and helpless, and so unable to avoid them. He should not tire the patient with talk—talking for talk's sake, and he should not make the patient do too much of the talking. It is better to pay a short visit than to spin out the time with pauses and uninteresting items. Above all, a visitor should make up his mind when he is going to leave—and leave. Indecision in leave-taking is very trying, to stand up and almost bid "good-bye," and then to start another subject, and then to make another abortive attempt to leave, has a wearing effect upon a patient's temper and strength. When he seems to have gone, and is just closing the door, to re-open it in order to say something else, is especially aggravating. All this wavering and indecision is bad for the invalid. A good nurse can show much skill in managing the entries and exits of visitors.

To judge of the effect of seeing visitors, it is necessary to watch the patient closely for some time after the visitors have left. During the visit the excitement and

the talking may arouse the patient to seem much better than he was before; but there must be a fall *below par* if there has been a rise *above par*, and this will be seen in the half-hour after the visit. The liveliness and flush will have gone, and exhaustion will have set in.

In some cases invalids are depressed, and want rousing. Here the visits only raise them up to par, and so they are not followed by reaction. It is in these cases that visits are most useful.

When there is great weakness, or where excitement induces exhaustion, food should be administered either before or after the visit, as is found best to suit the case.

Visitors should never be allowed either just before or just after a meal, or just before a patient's usual time of settling down to sleep.

A damp or frosty overcoat should not be allowed into the sick room.

## WASHING PATIENTS.

As a sick person's vital powers are always low, it is important that they should be expended as little as possible, so washing ought to be done at the time or times during the day when the patient is at his best. It is not always desirable to do all the washing at once, but at least the hands and the face should be done before breakfast. The teeth should be washed after meals. If the patient is unable to do this himself, they may be cleaned with a mop made of cotton wool twisted round a small piece of wood. In cold weather, when the vital powers are low, or when a chill would be specially dangerous, the patient must be kept well covered whilst being washed. This can be done without wetting the sheets by slipping a dry warm towel under the part to be washed.

Sometimes it is even necessary to keep a blanket or flannel next the patient until reaction sets in and all fear of a chill is passed. Fever patients are greatly refreshed by being sponged several times a day. Sponging may also induce sleep in a previously restless and wakeful patient. Brushing the hair has also a soothing effect, and can generally be well borne if properly done.

### DRESSING PATIENTS.

Articles of dress should always be well aired before being put on. In a surgical case affecting the limbs, in removing a shirt or other article of attire, it should be removed first from the sound side. In putting things on, the injured side should be done first. In rheumatic fever the same rules hold good. When both sides are badly affected, the shirt should be opened right down the front, and, if needful, from the neck to the wrist. Tapes should be sewn on to fasten it by.

When a patient sits up for meals, a flannel jacket forms a better covering than a shawl, as it protects the arms and does not press on the chest; there are also no ends to dabble in the food. If the skin is tender, the flannel may be lined with silk at the neck and wrists.

### BED-MAKING.

The bolster should have a separate cover, so as to let the under-sheet be easily changed. An under-blanket may be used in winter. It should, however, be wide enough to tuck under the mattress at each side, so as to keep it smooth, and avoid the wrinkles that are such common causes of bedsores. A spare pillow should be

kept in a cover. It is useful for raising the head, for changing in place of a hot one, or for supporting the back when a patient is lying on his side.

### CHANGING SHEETS.

Sometimes invalids cannot be lifted out of bed, and yet the sheets have to be changed. This, although often a great difficulty to those who have no knowledge of nursing, can be done very easily, and with hardly any disturbance of the patient.

#### *To Change the Upper Sheet.*

The best way is to spread out the clean sheet and lay it on the top of the bed-clothes (which must have been previously loosened all round). One person then holds the clean sheet tightly by the upper and lower corners of one side; another person standing at the opposite side of the bed catches the bed-clothes by the upper and lower corners, and draws them quickly but gently off the bed. The rest of the bed-clothes are then separated from the soiled sheet, and replaced on the bed over the clean one. A very useful modification of this plan is to remove one of the blankets some time before the sheet is to be changed, and lay it with the clean sheet on the bed. This lessens the shock and risk of chill, and prevents the idea of exposure.

*Another method* is to loosen the bed-clothes all round, and slip the end of the clean sheet in under them at the foot of the bed. One person then stands at each side of the bed, and, taking the upper end of the clean sheet in one hand and the lower end of the bed-clothes in the other, slips the clean sheet up into its place. The bed-

clothes are then removed, leaving the clean sheet over the patient, the soiled sheet separated, and the rest of the bed-clothes replaced. This method is not as good as the first, as it is more troublesome, and slower, and so more likely to chill.

*To Change the Under Sheet*,

the patient is to be turned gently on one side, and the soiled sheet—having been loosened all round—is to be rolled up lengthways until half of it forms a roll just against his back. A similar roll is to be made of half of the clean sheet, and it is to be placed against the other one at the patient's back. The bed is then in this condition: one-half is covered by the clean sheet, the other by the soiled one, the unused halves of the sheets forming rolls running from top to bottom down the centre, and the patient is lying near the centre on the soiled sheet. Now the patient is to be again moved, first to his back and then to his other side. During this movement he crosses the two rolls, and so lies on the clean sheet. It is now only necessary to draw away the soiled sheet, and unroll and arrange the remainder of the clean one.

In some cases—for example, *surgical* ones, where a splint or other apparatus has to be kept in position—it is injurious to turn a patient from side to side. In such cases the under-sheet must be changed by rolling from the top to the bottom. Two people stand, one at each side; all that is free of the soiled sheet is formed into a roll at the head; the clean sheet—rolled up—is placed above it. The patient's shoulders are then raised, and the soiled sheet rolled up, and the clean sheet unrolled, until the small of the back is reached. The shoulders

are then laid down, the hips raised, and the rolling and unrolling process continued. Finally, the feet are raised.

If necessary, the body must be sponged or wiped before it is laid on the clean sheet.

All sheets must be well aired and warmed before being put on the bed.

Food may be necessary either before or after changing sheets.

### DRAW-SHEETS.

Draw-sheets are used in surgical and other cases to keep the lower sheet from getting soiled. They are generally made by folding a sheet so that it shall reach from just below the shoulder to the knee. Sometimes a piece of waterproof sheeting is inserted in the folds.

Draw-sheets may be changed in the same manner as lower sheets. The patient is turned on one side, and the soiled draw-sheet is rolled up to his back; he is then sponged and dried, and the new draw-sheet—half rolled up—is placed against the soiled one; he is then turned over the double roll on to his other side, the soiled draw-sheet is removed, and the clean one unrolled.

The patient may also be raised and the draw-sheet slipped away, his back can then, if necessary, be washed and dried, and the clean draw-sheet slipped under him.

*Irrigation*, or dropping of water, is sometimes used in cases of inflamed joints. A can is placed at some height, and water is allowed to fall on the joint through a small tap, or a bunch of cotton threads dipping into the water are hung over the side, and allowed to act as siphons.

Here a waterproof sheet must be so arranged as to prevent the bed getting wet, by receiving the water and

causing it to flow into a vessel placed for the purpose on the floor.

### MOVING HELPLESS PATIENTS.

*A patient can be lifted* by two people joining hands under his shoulders and hips. If there is any injury the injured part should be supported and attended to by a third person. If a limb is broken it must not be held in a timid or nervous manner, but grasped firmly, supported on the palms of the hands and steadied with the fingers and thumbs. One hand should be above and the other below the seat of fracture. By this means much unnecessary shaking and consequent pain will be avoided.

If a patient is to be *changed from one bed into another* of equal height, the beds may be brought close together, and the patient drawn on the under bed-clothes from one to the other. Sometimes a patient can even bear to be rolled across. Sometimes a patient suffers pain on being touched, and yet ought to be moved, either to allow the bed to be made or to be laid on a sofa. In such a case the following plan will be found an excellent one:—

*Improvised hammock.*—Pass a blanket beneath the lower sheet (this ought to be done some time beforehand); then take the sides of the blanket and sheet, and let them meet above the patient, form them into a roll, and continue rolling until it comes nearly to the patient. If two people now take hold of the roll in different parts, they will be able to lift the patient. If some bits of stick have been placed in the centre of the roll it will be easier to keep the roll extended. The sheet and blanket form a regular hammock, and the even pressure on all parts of the body is not likely to cause pain.

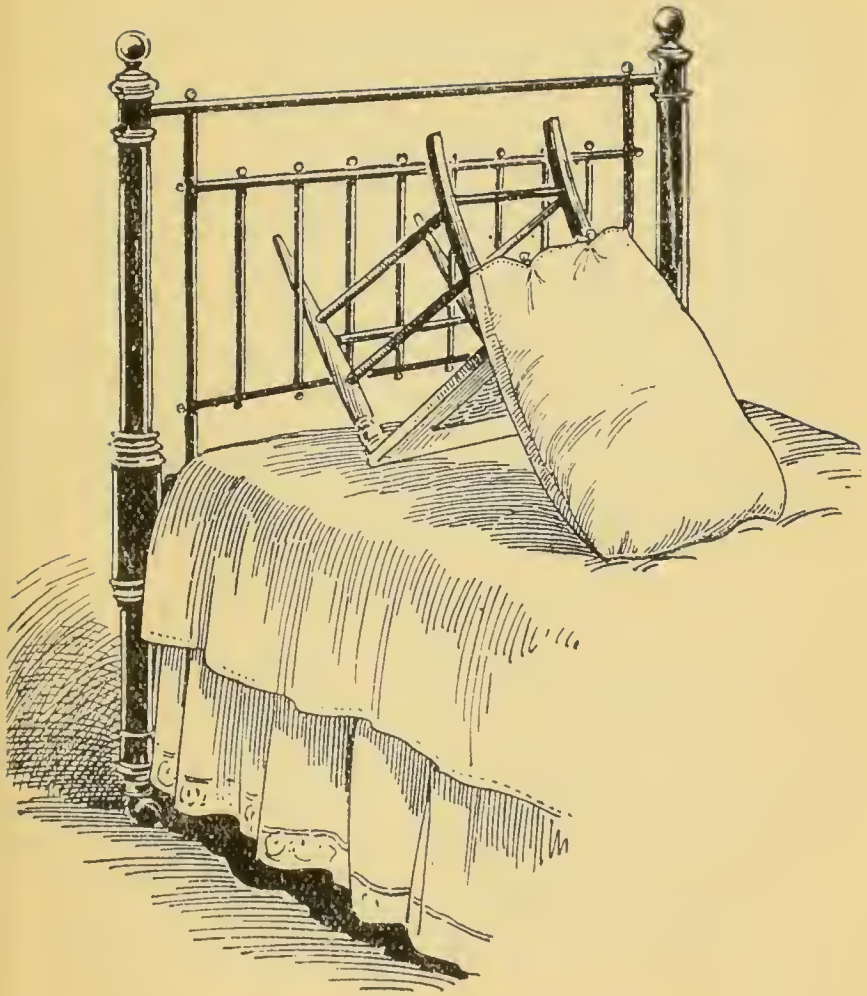


FIG. 4.—IMPROVISED BED REST.

Another method of making a hammock is to take two broom-handles or other long poles, and roll one up in the lower sheet and under-blanket at each side; by raising them the patient can easily be lifted.

### BED-RESTS.

*Bed-rests* are used to enable patients to sit up in bed. They are often a great assistance to convalescents, especially when taking food. Bed-rests with canvas backs, and an arrangement for altering their angle, can be bought cheaply, and are very efficient.

Bed-rests can be easily improvised. A chair turned upside down, so that the back forms a slant, will do if properly padded with pillows.

The padding of bed-rests must be carefully attended to, so as to make them fit against all parts of the back. The head also will need support.

### CRADLES.

"*Cradles*" are contrivances for removing the weight of the bed-clothes. They are chiefly used in surgical cases, for instance, fractures of the lower extremities. They are made of hoops of iron fastened below to side bars.

They are easily improvised. A three-legged stool does very well. A band-box also makes a good substitute if turned upside down, and the lid placed upon the bottom to add to its strength; a hole shaped like the entrance to a dog's kennel is then cut out of each side.

A still simpler device is to pass a corkscrew through all the bed-clothes, guarding its point, which is

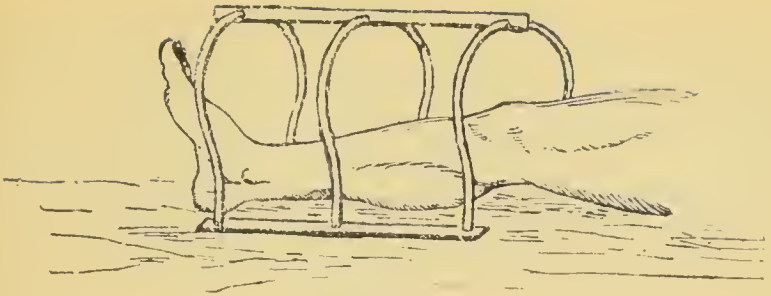


Fig. 5.

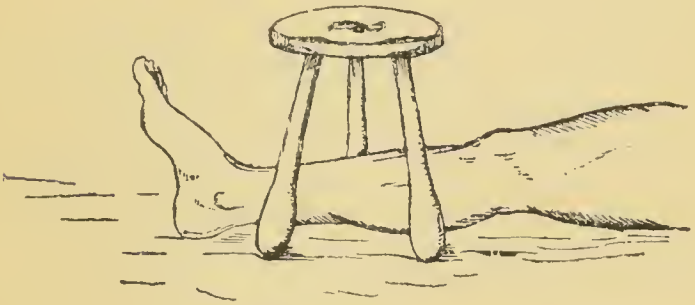


Fig. 6.

Fig. 7.

to be inside, with a cork. A string tied to the handle of the corkscrew, and passed over the top of the bed or over a nail in the wall, will enable the bed-clothes to be fastened at a convenient height. By using two or more corkscrews a regular "tent" can be made, removing the pressure of the clothes entirely from the patient.

## FOOD.

The great principles of dieting may be shortly explained thus:—

There are two great classes of *Organic Foods,* those that chiefly go to *build up* the tissues, and those that chiefly go to *keep up the temperature* of the body. All contain carbon, hydrogen, and oxygen; the former also contains nitrogen, and are such as lean meat, caseine of milk (cheese), and albumen. Many vegetable foods also contain a good deal of nitrogen, for instance, oatmeal and lentils. In this group occur the *gelatines.* They stiffen into jelly on cooling, and have been for long considered light and nourishing, and so suited to invalids. However, although their chemical constitution is very little different from that of albumen, etc., their value as tissue formers is very small, if not quite *nil.* The latter group only contains carbon, hydrogen, and oxygen; it is subdivided into *fats, sugars,* and *starches.*

The power of a food to act as a *heat-giver* depends upon the amount of oxygen (taken into the blood by the lungs) its carbon and its hydrogen can unite with. Therefore, the more "free" carbon and hydrogen, and the less oxygen of its own a food contains, the more heat it can give. *Fats* contain scarcely any oxygen, and so are the best heat-givers. *Sugars* and *starches* contain

free carbon, but all their hydrogen is neutralised by oxygen.

The *Inorganic foods* are water, and certain salts, most of which occur in other foods. The oxygen of the air may also be mentioned as an inorganic food. Chloride of sodium, or table salt, is the only salt used separately. Phosphorus and sulphur occur as phosphates and sulphates.

*The quantity and varieties of food* that are necessary have been calculated, by experimenting what diets and how much of them are required, to keep an adult man in health without increase or decrease of weight. Nitrogenous food, fat, and sugar *or* starch, must all be taken. The amount taken varies with the force and heat generated in the body. Much work and exposure to cold renders more food necessary, and rest and heat diminish the quantity.

It has been found that an adult man doing ordinary work in this climate requires each day 300 *grains of nitrogen and* 4,500 *grains of carbon*. The hydrogen need not be considered.

These quantities can be obtained in $\frac{3}{4}$lb. meat and 2lbs. bread, or in 1lb. meat, $\frac{1}{4}$lb. fat, and $\frac{1}{2}$lb. sugar. In practice such simply-formed diets would not do, as variety is necessary, and so we extract our carbon, nitrogen, etc., from a larger number of substances.

A "*mixed diet*" is best, as the proper proportions of the different elements can be exactly got in it. It would be injurious to live on meat alone (even putting the necessity for variety out of the question), for whilst enough nitrogen could be got from a single pound of lean meat, four and a half pounds would have to be eaten in order to supply the requisite carbon, thus throwing much

needless work on the stomach. On the other hand, to live on bread alone, nearly four pounds would have to be taken each day to get sufficient nitrogen, whilst two and a half pounds would supply the carbon.

*Milk* is a perfect diet, and its elements are mixed in proper proportions. It contains nitrogenous caseine, fat (butter), sugar, salts, and water. It is the only food needed for young children, and is capable of supporting adults who from sickness or other causes are not capable of much exertion.

*Oatmeal* forms a capital diet. The necessary nitrogen and carbon can be got from about 1½lbs.

*Diet has to be altered for invalids.* Being ill and not taking the usual amount of exercise necessitate this. It must be particularly attended to if the digestive canal is affected, or if there is special need of support, danger from stimulating food, etc.

The *method of cooking* used has a great effect on the nutritious properties of food. As a rule two or three minutes at boiling point, and then continued application of heat slightly *below* boiling point, is the treatment that combines the maximum of nutrition and digestibility with the minimum of waste.

*In roasting, broiling, or boiling,* the first application of heat should be intense, to harden the outside. The heat should then be decreased. This prevents the loss of the juices; too long an application of intense heat would harden all through.

*In making soup* the meat should be put into cold water and slowly heated up, as the object is to get the nutriment into the water.

*Baking* is not as wholesome as roasting, owing to the want of ventilation.

*Frying* is bad, it hardens the substances, and adds to them products of the decomposition of the fat used for frying.

## SICK-ROOM COOKERY.

*Cleanliness,* admirable in all cookery, is especially necessary when providing for the sick, a delicate appetite being easily disgusted. So, all articles used in connection with the cooking of food must be perfectly clean. The serving also must be cleanly—a messed drinking cup or sloppy saucer is uninviting, and soils the hands and clothes. Everything should look nice and tempting—the tray cloth clean, the silver and glass bright.

*Too much of anything should never be made.* It is far better to make a little and have variety. The sight of a large bowl of beef-tea might destroy all appetite, while a small cupful would be welcome.

*The bulk* of everything should be as small as possible.

*Something should always be in readiness.* The wish for food often passes away whilst it is being prepared.

*Food must never be left in the sick-room.* It should be brought at the right time, and taken away, if left. No one should use food which has been in the room with an infectious patient. Water for drinking should always be drawn fresh, otherwise it will absorb the poisonous particles from the air.

Sometimes, in cases of great prostration, food must be given at *short intervals;* if necessary, the patient should be wakened, for loss of strength continues during sleep.

It often happens that patients are *unable to eat solid food the first thing in the morning,* and yet if food is not taken the ability to take it will decrease. In such cases a little liquid food will be refreshing, and prepare the

way for a more solid meal. Thus people, who without being absolutely ill, are yet not quite strong, often derive benefit from taking a cup of tea before rising; it prevents fatigue being felt in dressing, and so enables a fair breakfast to be made.

*No cooking is to be done in the sick-room.* It takes a robust appetite to stand the odours of cooking. *Tea* is an exception, as its fragrance is refreshing.

*If the amount of liquid to be taken is limited,* the exact quantity should be measured out, as many patients, and especially children, dislike to be stopped in the middle of a drink. It is well to remember that the smaller the glass the larger the drink will appear.

*In raising a patient to drink,* the hand should be passed behind the pillow to support both the head and shoulders. If the neck is too much bent, swallowing will be difficult. If the head is not lifted straight, the fluid will escape at the corner of the mouth.

Every house should contain a *feeding-cup,* shaped somewhat between a sauce-boat and tea-pot. When one is not to hand, an afternoon tea-pot makes a fair substitute. An *improvised syphon* may also be made by taking a piece of glass tubing, bent at less than a right angle. The patient can suck the fluid through the longer end, and then it will continue flowing of itself. When enough has been taken, the *shorter* end is to be lifted out of the fluid, otherwise it will continue to flow, and make a mess. A foot of india-rubber tubing, such as is used in infants' feeding-bottles, also does very well.

### SICK-ROOM DIETARY.

A *sick-room dietary* is given as Appendix I.

Fig. 8.

## STIMULANTS.

*Alcoholic stimulants* are very rapidly absorbed. They have an exciting effect on the heart, causing it to beat more rapidly; from this and from their paralysing action on the nerves, controlling the supply of blood to the surface, they cause the skin to become flushed, and so give rise to the sensation of warmth. Owing, however, to the heat being driven to the surface, and to the regulating mechanism being tampered with, the increased skin-heat soon gives place to a lowering of the temperature of the whole body. These effects are more or less masked by taking food with or after the stimulants, and by remaining in a warm room.

*Alcoholic stimulants* should not be given by a nurse, unless under direct instructions from the medical man. Giving wine and such stimulants to the sick and weak is decidedly injurious. Hot milk and soda-water, a little soup, a cup of warm tea, a hot bottle or mustard and water for the feet, are all safe and efficacious, and do not cause any subsequent depressing reaction.

*When alcoholic stimulants are ordered*, the nurse must find out the kind and amount intended, and when they are to be taken. Unless specially ordered, they should never be given without food. The *exact* amount taken should be carefully remembered. If ordered during convalescence the nurse should inquire *how long* they are to be continued.

All forms of spirits must be well diluted before being used.

## ADMINISTRATION OF MEDICINES.

All medicines should be given as inoffensively as possible. The bulk should be small, and any disagreeable

taste or smell should be concealed. It is very important to render medicine as pleasant as possible to children; it saves tears and struggles, and in critical cases may even obviate additional risk.

*Castor-oil* can be best taken in strong milkless coffee. Some coffee is to be put into two cups; the oil is to be added to one and well beaten up; the mouth is then to be rinsed with some of the coffee in the other cup; the oil and coffee are to be swallowed, and the mouth once more rinsed with the remainder of the plain coffee. By this means the castor-oil is absolutely untasted.

Castor-oil can also be given in orange juice. The juice of half an orange is to be squeezed into a glass; the oil is to be placed floating on it, and the rest of the juice is to be squeezed on the top.

Children will generally take castor-oil well when it is shaken in a bottle with warm milk, sweetened and flavoured. Cinnamon-stick is capital for flavouring it.

*Cod-liver oil* is generally popular with children. It is best taken with a little salt, which suits its "fishy" nature much better than sugar. It can be taken quickly and cleanly when floating on the surface of any liquid, such as milk. If the milk be warmed and the oil shaken up in it, the taste will be much concealed.

*Effervescing medicine* is divided into two parts, one acid and the other alkaline. The acid part generally contains citric acid or tartaric acid, or lemon juice; the other part is generally rendered alkaline by soda or potash. When the two parts are mixed, carbonic acid gas is formed and given off, causing effervescence. The best way to give effervescing medicine is to pour the two parts into different glasses, and, giving the patient one to hold, empty the other into it. By this means it

effervesces at once, and can be taken whilst brisk, but if the second part be added in a spoon and stirred up, the gas is lost and the medicine is flat when taken. Carbonic acid gas is only a poison when breathed, and not when swallowed.

*Powders,* if small, can be given in pounded white sugar, moist sugar, or jam. "Dover's powder" should be dropped on the surface of water or milk, and allowed to partially dissolve. For children the best plan is to put a little bread-and-milk into a spoon, put the powder (mixed with sugar) on it, and cover it over with some more bread-and-milk.

Pills may be easily taken thus:—the pill is to be placed in the mouth and retained in the front of it with the tongue; some water is then to be taken, and the head thrown back, the pill being at the same time liberated. The water and pill reach the back of the mouth together, and are mechanically swallowed.

Pills can be swallowed whilst eating bread.

Some people find it easier to swallow a large pill than a small one.

Oval pills are popular, as they are easily swallowed.

*Old medicines should not be preserved.* Many medicines deteriorate, and what is good at one time may not be so at another. The fewer medicine-bottles lying about, the less the risk of the wrong medicine being administered.

# CHAPTER V.

## DETAILS OF NURSING—*continued.*

### OBSERVATION OF THE SICK.

In dealing with the *observation of the sick* many points have to be considered which, although impossible to separate in practice, can be best dealt with separately here. These include symptoms and means of diagnosis.

With regard to symptoms, it is necessary to know their causes, variations, and teachings. With regard to means of diagnosis, it is necessary to know how and what they teach, and how they can be used.

For both it is important to acquire a habit of close observation. Once the habit is acquired, its practice is easy; if not acquired, much will pass unnoticed.

Nothing is too trivial to observe. A very slight alteration may give warning of an approaching serious change. *It is far better to tell the doctor too much than too little.*

### RIGOR.

The meaning of *rigor* is "stiff coldness." The word is applied in medicine to the shiverings which occur during the course of many illnesses. It is often one of the earliest visible symptoms. All fevers and inflammations are ushered in by rigors; in the intervals

between the rigors a feeling of extreme heat is generally experienced. Sometimes they are numerous and strong, in other cases they are less well marked. Inflammation of the lungs is generally ushered in by one long severe rigor.

A case of fever is generally considered to commence at the first rigor; the exact date of its occurrence should therefore be carefully inquired into and noted.

*During a rigor* the patient has a feeling of extreme cold, particularly down the spine, and shivers violently. Notwithstanding the feeling of cold, the temperature of the body (as shown by the thermometer) may be actually raised.

The best *treatment* is to cover up warmly, apply a hot bottle to the feet, and give a warm drink (stimulants are dangerous and injurious). As soon as the rigor passes away the bed-clothes must be lightened. Rigors must never be made an excuse for letting the air of the room get overheated and impure.

## SLEEP.

*Intervals of rest alternating with periods of work* are the necessary condition for the healthy performance of the functions of the body. The heart, incessantly as it seems to work, spends half its time in a state of absolute rest—working for one half-second and resting for the next. In respiration the muscles that act in inspiration rest during expiration. When muscles have been used in violent exercise they become exhausted, and must be allowed an interval of repose.

Whilst consciousness lasts the brain is in a state of activity: to obtain rest for it unconsciousness is neces-

sary. It would be manifestly inconvenient, however, if we underwent rapid alternations of consciousness and unconsciousness, so the brain performs a long spell of work in the daytime, and takes a long rest in the night.

*In illness* sleep is often deficient, the brain showing many symptoms of being worn out. The return of sound natural sleep often marks the turning point of an illness.

The amount of sleep that patients have *should be observed*; also whether there are long intervals of wakefulness; whether the sleep is sound, or broken by dreams, movements, or talking; whether the talking amounts to delirium; and what the condition as to freshness of mind and body is on waking.

In critical cases the nurse ought to note the exact amount of sleep and its character.

It is a great mistake to keep a house too quiet in order to help an invalid to go to sleep. If this is done, the slightest noise is apt to awaken him. In some cases, however, every precaution must be taken to ensure rest.

In cases where food or medicine is ordered to be taken at intervals of so many hours, the doctor should always be asked *whether the patient is to be awakened* to take it. This is very important, as sometimes sleep is a sign of exhaustion, and death may ensue from want of food; whilst in other cases sleep is a sign of a change for the better, and may be the gateway between disease and health.

*During sleep* there is less blood in the brain than whilst awake; so anything that drives an unusual amount of blood to the head is bad for sleep—for example, mental effort, coldness of the extremities.

*Quietude and darkness* generally encourage sleep. Cold applications to the head and heat to the feet may

be useful. Sounds, such as the ticking of a clock, often prevent sleep.

*Narcotics* should never be taken without medical advice. Their use soon grows into a habit, injurious if persisted in, and hard to give up.

## PAIN.

*It is necessary to be guarded in judging of pain* by a patient's description. Some people are more sensitive to pain than others, and some bear it worse than others.

The chief points to be noticed with regard to pain are: —

*Situation.*—A patient must be asked *where* the pain is, for "leading questions" often call forth misleading answers—whether it is *localised* and stationary, or whether it is widespread or shifting. Superficial pain is generally increased by slight pressure, deep pain by harder pressure. The situation of the pain does not always coincide with that of the disease, as pain may be *reflected* some distance by the nerves. Thus pain in the knee often accompanies hip-disease, and pain in the side of the face may arise from a decayed tooth.

*Intensity*—whether severe or trifling; whether increasing or diminishing.—Most of the words used to indicate degrees of pain are misleading, as they are used according to the fancy of the sufferer. Thus, such words as "fearful," "unbearable," &c., are often used where "slight" or "rather bad" would do.

*Character.*—In *cancer* the pain is lancinating, in *neuralgia* darting, in *pleurisy* acute or cutting, in *rheumatism* aching or gnawing.

How it is *affected by movements, &c.*—In pain connected with the *breathing organs*, respiration often increases it.

In diseases of the *stomach*, food may bring on a fresh attack. In certain diseases of the *eye*, exposure to light excites pain. In many *brain* diseases, both light and sound increase the suffering.

*What gives relief.*—It is necessary to watch closely what gives most relief. Heat, cold, poultices, fomentations, cold lotions, rest, movements, change of posture, elevation of the part, and numberless other simple things, give relief in different cases, and in many cases it is only by watching that what is best can be discovered. It often happens that an attentive nurse is a better judge than the sufferer of what *really* gives relief.

## POSTURE.

The *posture* of a patient must be carefully studied, as it is often an important guide to the progress of a case. The following examples will show this:—

In very exhausting diseases—for instance, towards the end of a *long fever*—an absolutely horizontal posture is natural, as to keep the head raised upon the pillow requires a certain degree of muscular exertion, and a patient's head may have to be frequently raised. Here any tendency to lie with the head more raised is of good import.

In diseases where the *breathing is difficult*, there is frequent inability to lie down, the respiratory muscles having most power in the erect position. In such cases it is a good sign to see a patient lying lower down, *provided the strength keeps up*. Lying down might be a sign of collapse and impending death.

Lying on one side is often a sign of *local disease*. As a rule, in lung diseases the patients lie on the affected side, so as to leave the unaffected side free.

In *inflammation of the bowels,* lying on the back, with the knees drawn up, is the usual position. This relaxes the abdominal muscles, and so lessens pressure on the painful parts.

In *colic,* as pressure relieves, the sufferer often lies on his face.

*A patient should be assisted to retain the easiest and best position.* Pillows must be arranged if necessary to support not only the head, but also the shoulders and upper part of the back. If there is a difficulty in retaining a side position, a pillow laid against the back will be of assistance. If there is inability to lie down, a comfortable bed-rest must be got or improvised. Constant attention may be necessary; pillows soon get disarranged, and there is a continual tendency to slip down. One of the most important points in connection with posture occurs in lengthened fevers, in which there is a tendency to lie unchangingly on the back. This is a most dangerous thing, and must be overcome by the nurse. Lying continually in the one position causes a tendency to congestion of the lungs, and in exhausting diseases this is a most fatal complication. It is best guarded against by altering the posture of the patient, avoiding letting him lie on his back, and changing him occasionally from side to side.

The tendency to slip into an absolutely horizontal position may sometimes be lessened by raising the lower feet of the bed on small blocks of wood.

A "bed-rope" attached to the top of the bed, or to a hook in the wall or ceiling, is a great assistance to a patient, either when he wants to change his position or to sit up.

In some diseases a sudden *change of posture* is dan-

gerous. Lives have been lost in cases of inflammation about the heart, from carelessly raising a patient to take food.

Peculiarities or changes of posture must be reported to the medical man; they may give early warning of complications.

### THE SKIN.

In making observations on *the skin*, the state of the observer's hand must be taken into account, such observations being chiefly relative. Thus, the temperature of the skin seems normal when it is the same as that of the hand feeling it.

The *heat* of the skin is an important point to notice. It will be dealt with under the head of "Temperature."

The skin may be *dry* or *moist*. Acute attacks are often ushered in by *alternate* dryness and moisture. Dryness generally accompanies increase of temperature, and a change from dryness to moisture is mostly a favourable sign. The sweats in consumption and other cases of extreme prostration are of course exceptions. In rheumatic fevers there are copious *acid* sweats.

Perspiration is Nature's agent for reducing the temperature.

*Eruptions* are very important to discover early, and so they must be carefully watched for. In *small-pox* about *the third day* small pimples appear, first on the *face*. These change into vesicles (blisters), and then into pustules (containing "matter"), finally drying into scabs, which drop off.

In *scarlatina* on *the second or third day* a red rash appears, first on the *face*, neck, and perhaps chest. It begins in spots, but these soon join together into an uniform red rash; finally

the outer skin peels off. In *measles* about *the fourth day* a rash (not quite so bright as that in scarlatina) begins on the *face*, extending over the body and limbs. It is more "patchy" than in scarlatina. In *typhoid fever*, small, round, rose-coloured spots appear towards *the end of the second week*. They are generally first observed on the *abdomen*, and disappear temporarily on pressure. In *typhus fever* a rash appears towards *the end of the first week* over the *chest*, abdomen, and upper part of the limbs; these are "mulberry spots," and a dusky mottling which seems as though seen *through* the skin.

The *colour* of the skin varies greatly in disease. In *fainting* it is often pale, in *collapse* it is bluish, in *fever* it is flushed. When the *breathing is much interfered with* it is dark and congested. In *bilious fever* and *jaundice* it is yellow.

*Emaciation* is often seen in the skin. It generally occurs in severe chronic disease. In children the fat which lies beneath the skin is often rapidly absorbed, leaving it flabby and in folds.

### THE TONGUE.

The condition of the *tongue* gives some information as to the state of the digestive organs. It may be *pale*; *too red*, as in *scarlatina*; *furred*, as in *indigestion*; *dark coloured and cracked*, as in some *low fevers*; *swollen*, sometimes so much so that the sides are marked by the teeth (one side is often more swollen than the other in *local affections*); *protruded with difficulty*, as in *low fevers* and *apoplexy*; *protruded to one side*, as sometimes in *paralysis*; *tremulous*, as in *nervousness*, *low fevers*, *delirium tremens*.

*Name* ..... *Date* .....

| Time. | Sleep. | Medicine. | Action of Kidneys and Bowels. | FOOD. Kind and Quantity. | Doctor's Orders. |
|---|---|---|---|---|---|
| A.M. | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| P.M. | | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |

| | M. | E. |
|---|---|---|
| Temp. | | |
| Pulse | | |
| Resp. | | |

FIG. 9.

This form is very useful for nurses, as it affords a ready means of recording everything of importance, with the time of occurrence. Such a chart enables a nurse to give the medical attendant an accurate report of the patient's progress, and is a guide to a nurse coming on duty.

Enlarged copies may be obtained from the St. John Ambulance Association, St. John's Gate, Clerkenwell, London, E.C.

The manner in which the tongue *cleans* after an illness should be noticed; the fur generally cleans off first at the tip and edges.

In *examining the tongue* it is important to notice the size and shape; the colour, especially at the tip and edges; whether it is dry or moist; whether it is furred; whether it changes for the better or the worse should also be carefully noted.

The tongue should be inspected *before* food is taken.

## APPETITE.

The sensations commonly known by the names of hunger and thirst are local manifestations of general conditions. *Hunger* is caused by deficiency of food in the system, and is relieved by its introduction. The mind refers the sensation to the stomach; but since the introduction of food directly into the blood relieves the sensation, it cannot depend entirely on the state of the stomach. That it does so in some measure is shown by the fact that taking food relieves some of the symptoms of hunger before any of it can possibly be absorbed.

*Appetite* is nearly always *deficient* in disease, particularly if of an acute character. *Excessive* appetite occurs rarely, but is not of much importance. Instances of *perverted* appetite are occasionally met with. *Capricious* appetite is common in illness.

The *chief points to observe* with regard to appetite are —the amount of food taken, the frequency, its nature, whether taken with relish, whether it satisfies, whether tasted, whether followed by pain, eructations, or vomiting, whether digested.

## THIRST.

The sensation of *thirst* arises from a peculiar state of the mucous membrane, chiefly of the mouth. It is generally caused by an insufficient supply of liquid, the actual sensation arising from the state of the blood. It is relieved, not so much by liquid passing over the mouth, as by its being swallowed, and absorbed into the circulation by the veins of the stomach.

*Excessive thirst* may arise from two very opposite morbid states. In fevers and inflammations when the blood is too stimulating and requires dilution, and in cases of extreme exhaustion and want of blood. Loss of the watery parts of the blood, as by profuse perspiration, is a common cause of thirst; and alcohol, salt, and many other articles also induce it.

Slightly acid drinks are best for *quenching thirst*; they stimulate the glands of the mouth to form saliva, and so remove the dryness of the mucous membrane. Tepid drinks also remove thirst by softening the mucous membrane.

## VOMITING.

The *mechanism of vomiting* is to a great extent the same as that of coughing. First, a deep inspiration is taken; next, the "glottis," or narrow part of the throat, closes, and the abdominal muscles contract. Here the processes differ, instead of the glottis opening as in coughing and letting a sudden rush of air out, the glottis remains closed, the lungs cannot be emptied, and so the stomach is pressed upon and its contents expelled.

The chief *causes of vomiting* are: I. *Local. Irritating or altered food* in the stomach, as in indigestion. *Irritating secretions*, as bile

*Diseases of the stomach*, as inflammation, ulcer, or cancer. *Obstruction along the course of the bowels. Poisoning.* II. *Distant.* In these cases it occurs *through the action of nerves directly* from the brain, or by "*reflex action*," *i.e.*, some irritation, as of worms, &c., being conveyed to the brain, and then being reflected to the region of the stomach. Vomiting often occurs in the course of illnesses, it is generally from the presence of irritating secretions.

The *chief points to notice* are when and how often vomiting happens. Whether after food or when the stomach is empty. Whether there is much feeling of discomfort or pain. Whether accompanied by straining or retching. Whether it leaves much weakness. The nature of the vomited matters.

Whether vomiting is *gastric* (caused by the state of the stomach or its contents), or *cerebral* (from the brain), may be generally told. *Gastric vomiting* is usually preceded by a feeling of nausea; there are other symptoms pointing to a disordered state of the stomach, and the vomiting generally relieves. In *cerebal vomiting* there is often no nausea, there may be other brain symptoms, and the vomiting may not relieve. The vomited matter is often of a green colour.

The *treatment* is to put lying down, to loosen the clothes, to admit fresh air, and to give small quantities of ice (which should be swallowed before being quite dissolved), or cool drinks such as soda-water with or without milk. Sometimes a little magnesia or bi-carbonate of soda gives relief. In vomiting from poison, an emetic of mustard (or salt) and tepid water should be given, as the vomiting depends on the presence of the

poisonous matters; butter or oil should also be given to protect the walls of the stomach.

## COUGH.

*A cough occurs thus*: There is an increased inspiration, the "glottis" or entrance to the windpipe closes; there is an attempt at expiration; suddenly the glottis opens and the air rushes out.

The ordinary *cause of cough* is that there is *something in the air passages which requires to be removed*, and which may be carried along by the rush of air in a cough, although ordinary breathing fails to move it; in these cases cough may be very beneficial. The upper part of the throat is very sensitive, and so the slightest irritation is sufficient to excite a cough.

Sometimes cough is caused by the *irritable state of the mucous membrane*, as in inflammation; here the cough may do harm by keeping up the irritation. Cough may also be caused by disease, away from the respiratory organs, by the action of the nerves. Thus affections of the stomach, brain diseases, &c., may give rise to cough.

The chief *points to notice* with regard to cough are: The frequency of its occurrence. Its severity and duration. Whether brought on by some apparent cause, as change of posture, cold air, &c. What its characters are. Whether dry and tight, as in early bronchitis, or soft and loose as in a later stage. Whether hacking, as often occurs in the earlier stages of consumption, or deep and distressing as later on. Whether short and sharp as in inflammation of the lungs. Whether hoarse, as in croup. Whether in paroxysms, as in whooping cough. Whether dry, or attended with expectoration. The characters of

the expectoration. Whether the cough terminates in vomiting, or in the relief of any previously distressing symptom.

### EXPECTORATION.

In a state of *health* the exudation from the mucous membrane lining the air-passages is only sufficient to moisten and soften it. When, however, the mucous membrance is affected by disease, the amount and character of this exudation may vary greatly.

It is *lessened* in the early stage of bronchitis, causing a raw feeling. It is oftener, however, *increased* in quantity, as in catarrh, bronchitis, inflammation of the lungs, and consumption.

Its *character* may be:—*Mucous*, the ordinary secretion being merely increased, as seen in catarrh; *Purulent*, as late on in bronchitis; *Bloody, heavy*, containing lung tissue, as in consumption; *Putrid*, in some rare diseases.

Expectoration should be received into a special vessel, either empty or containing a certain quantity of water, and must be preserved for the inspection of the medical man. *After* his visit the vessel should be cleaned.

In infectious diseases some disinfectant should be put into the vessel.

The chief *points to notice* are:—The quantity, the ease with which it comes up; whether it is watery or thick and viscid; the colour; whether it sinks in water; whether it is frothy and mixed with air; whether it is streaked with blood; whether it is intimately mixed with blood.

### EFFECTS OF REMEDIES.

*The effects of remedies* must be carefully noticed. In *diarrhœa* or *costiveness*, the number, characters, and

quantity of the motions should be observed. In *typhoid fever* this is a most important point. In cough, whether it is alleviated, and if so, whether it is less troublesome at night, whether the attacks are less frequent and prolonged. In *vomiting*, whether decreased, and if so, whether in frequency or quantity. Whether occurring at longer intervals after food; whether more or less of the food taken is returned; and whether accompanied by less pain. In *sleeplessness*, whether relieved, and if so, to what extent; whether the sleep is sounder and for longer periods. In *pain*, whether it is relieved, and if so, whether in severity or duration.

The effects of remedies with *specific actions* must be carefully watched for. Also for any action other than medicinal; for instance, poisonous. Strychnia causes twitching of the muscles and stiffness; arsenic: pain in the abdomen and symptoms like those of catarrh; quinine: headache, singing in the ears; mercury: soreness of the mouth, profuse flow of saliva; belladonna: dryness of the throat, red rash, and dilatation of the pupils; opium: progressive stupor, contraction of the pupils.

## THE PULSE.

*The pulse* is a great guide in most diseases, as the heart and blood vessels are affected by nearly all illnesses.

*The pulse shows* to a certain extent the force of the heart, its condition, the excitability of the nervous system, and the fulness of the blood vessels.

There are many words used to express different *characteristics of the pulse*, but their exact meaning is impossible to define; the following examples may help to explain some of the different varieties.

In *fever* the pulse is quick and strong. In *inflammation* it is quick, hard, and full. In extreme *debility* it is very rapid and small, or "thready." A compressible pulse is one that disappears under slight pressure. There may be irregularity, either of strength or of interval between the beats.

The *number of beats* per minute should always be counted; in many cases regular notes must be taken morning and evening for the medical man.

*To take the pulse* the tip of the first finger of the right hand is to be laid on the front of the wrist, about half an inch from the outer border. As soon as the pulse is felt, the number of beats during a minute should be counted by means of a watch with a "seconds hand." In restless patients or children it need only be counted for half-a-minute.

The pulse should be taken whilst a patient is as tranquil as possible. Exercise or excitement may cause increased rapidity of the pulse for some time. In very nervous cases it should be taken quietly, as the very knowledge that it is being taken might increase its frequency.

The *average rapidity* of the pulse is:—In adults, 70 to 80; in infancy, 100 to 120; in childhood and youth, 80 to 100. In old age it is sometimes very slow.

In order to learn anything from the pulse in disease, it is necessary to be well acquainted with its character in health.

### RESPIRATION.

Count the *respirations* without letting the patient know that you are doing so, or the rapidity will be altered involuntarily. It can often be done whilst pretending to count the pulse. In the case of a young

child, lay the hand on the abdomen. An adult breathes about seventeen times a minute.

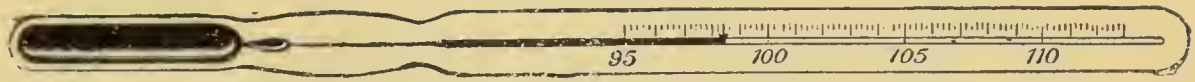
### TEMPERATURE.

*The temperature* in health, taken in the armpit, averages 98.4 deg. F. If it remain for any length of time more than a degree above or below this, it is an almost certain sign of disease. Rising or falling ten degrees from this standard is nearly incompatible with life.

To measure the exact temperature a *medical* or *clinical thermometer* must be used. This differs from an ordinary thermometer in being small, sensitive, self-registering, and only showing temperatures between 90 and 110, that being the range of the human temperature in disease.

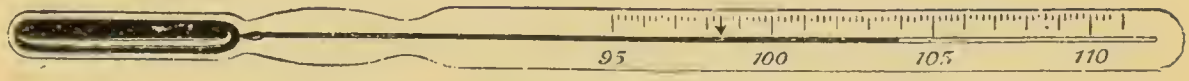
The *self-registering* is managed thus:—A small thread of mercury (the index) is separated from the rest of the mercury by a minute bubble of air. This prevents the two portions ever quite touching and joining. The main bulk of the mercury lies in the bulb, the thread remains in the stem. Before using the thermometer the thread is to be shaken down until it is near the bulb (if it were shaken *into* the bulb the thermometer would be spoiled). The thermometer is then to be placed in the armpit. After some time the mercury in the bulb expands into the stem, driving the thread before it; at length it goes as far as it will. If the thermometer is now taken out, the cold air will make the mercury shrink back into the bulb, but the thread will remain, showing how high the mercury rose. The end of the little thread of mercury *farthest* from the bulb marks the temperature.

Before *putting in the thermometer* the armpit should be wiped; the bulb should then be laid against the skin,




Thermometer registers normal.


Thermometer registers 100°.




Thermometer registers 104°.

FIG. 10.

Three thermometers with the mercury at different heights.

and the arm pressed to the side. The thermometer should then be left for ten minutes; if it is to be kept for the doctor to read, it must be laid carefully on its side and not shaken.

When the observations are to be made, they should be written down, and the exact time recorded.

*The index must always be shaken down immediately before the thermometer is used.*

To "read" a thermometer accurately requires much practice; however, the usefulness of the knowledge quite repays for the trouble of acquiring it.

## BATHS.

*Baths* are important in health and disease. In health they are chiefly used for cleanliness. They remove impurities from the surface, and prevent the pores being clogged by their own secretions or by the articles of the outer skin which are being continually shred. These objects are promoted by friction and by soap, the alkali of which dissolves off the fatty matter of the perspiration, which would resist the action of water. Baths are also used in health for their tonic effects.

In illness baths are greatly used. To understand their effect a few words of explanation are necessary.

*The human skin,* although fitted to withstand changes of temperature in air, cannot do so in water. The capillaries contract and drive the blood from the skin when the air is cold, and dilate and give off heat when the air is warm, thus keeping the body always at the same temperature. In water, however, it is different. Immersion for any length of time in a bath at 75 deg. F. (air at that temperature would be unpleasantly warm) is felt to be cold and depressing; whilst water at 100

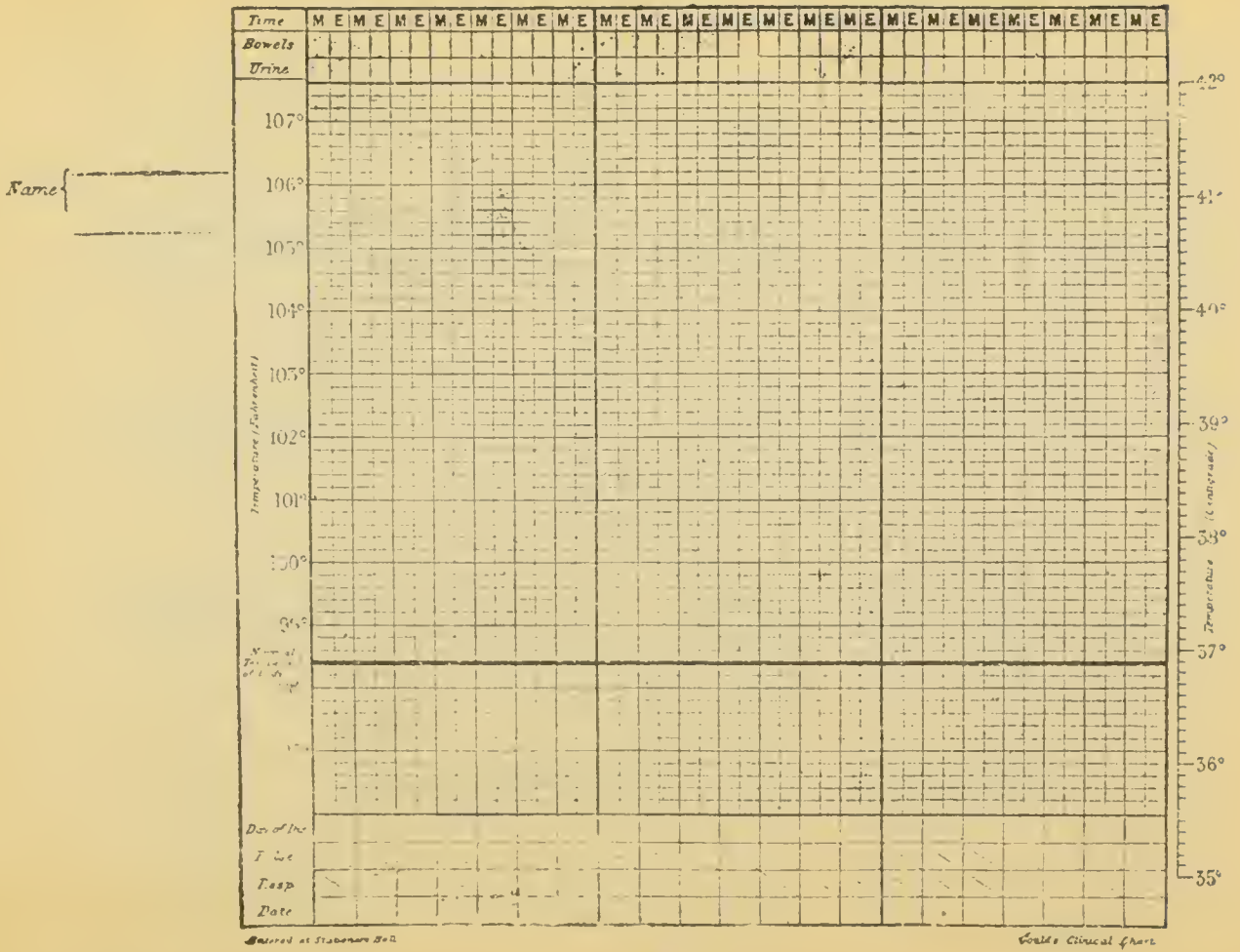



FIG. 11.

A temperature chart drawn on a reduced scale. It will be noticed that pulse, respiration, &c., can also be recorded on it.

deg. F. has a far greater effect than air at the same temperature. This is partly because immersion in water checks the perspiration, which in air would counteract the effect of the heat.

*The effects* of a hot and cold bath are almost exactly the opposite of each other. A *hot bath* causes dilation of the vessels of the skin and consequent heat, and is followed afterwards by reaction, the vessels of the skin contracting and driving the blood into the body, a sense of chilliness being also perceived. A *cold bath*, on the other hand, causes a sensation of shock, the blood being driven into the centre of the body. It is also followed by reaction, but in this case the reaction is a healthy glow and feeling of warmth in the skin. Too prolonged immersion in cold water may have such a depressing effect that no immediate reaction follows.

A parallel may here be pointed out between the contrary effects of hot and cold baths and those of alcohol and exercise; the alcohol resulting somewhat similarly in lowering the temperature, and exercise in causing a pleasant glow.

*Baths are generally divided* as follows:—

*Cold Baths.*

*Tepid Baths,* 85 deg. F. to 95 deg. F.—They only act on the skin, and do not affect the nerve centres. They do not affect the temperature, and are not followed by reaction.

*Warm Baths,* 96 deg. F. to 104 deg. F. cause stimulation of central nervous system, followed by slight flow of blood to the skin and increased frequency of pulse.

*Hot Baths,* 102 deg. F. to 110 deg. F.—Pulse and respiration increase greatly in frequency, and profuse perspiration follows.

*Very Hot Baths*, 110 deg. F. to 120 deg. F.—Anything above 120 deg. F. feels almost scalding. A very hot bath can only be borne for a very short time—it has such a strong effect on the action of the heart and lungs.

*Hot-air Baths* differ from water baths in causing copious perspiration.

*Hot Vapour Baths*, by checking perspiration, cause an increase of temperature that cannot be borne long.

When a patient is put in a bath his shoulders should be covered with a blanket. On coming out a warm sheet should be at once thrown over him. He should then be dried and got into bed as rapidly as possible.

*Children* are often frightened when they see a steaming hot bath. In such a case a blanket should be laid over the bath, and the child placed on it and gradually lowered into the water. A cork or a toy floating about will generally engage his attention.

It is very dangerous to put a child into too hot water, so the temperature of a bath should always be taken carefully with a thermometer graduated up to 212 deg. F. The hand is a very unsafe guide as to temperature, particularly in the case of those who are accustomed to manual labour. If there is no thermometer at hand, *the elbow* will give a fair idea as to whether or not the heat of the bath is bearable.

A *vapour bath* may be given thus: put a chair and foot-stool into a bath, put the patient on the chair and cover him with blankets, hanging from his shoulders over the edges of the bath. Pour boiling water into the bath. More may be added as required.

Another way is to put a tub of boiling water under a chair, put the patient sitting on the chair, wrapping

blankets round him. Have a couple of hot tiles, and add them one by one to the water as required.

*Wet sheet packing* is done thus: a sheet is wrung out of cold water, a blanket is laid on the bed, and the sheet is spread over it; the patient is put lying down, and the sheet is wrapped round him, and then the blanket. More blankets are then thrown over him. In a few minutes a warm glow is felt, the pores of the skin are opened, and the blood fills the vessels of the skin.

BED-SORES.

*Bed-sores* are usually the result of inflammation caused by continual pressure, the skin sloughing and leaving an unhealthy sore. They are generally on those parts which are most subjected to pressure.

Bed-sores are *often caused* by crumpling of the sheet or by crumbs; so the lower sheet must be kept smooth and clean. Lying on a blanket also increases the tendency to bed-sores, as it retains moisture and acts like a poultice.

*Cleanliness* is of the utmost importance in preventing bed-sores. The patient should be sponged daily with warm water, to which a little vinegar may be added. If necessary, local cleanliness must be maintained by more frequent washing.

When washing a patient or changing sheets, the nurse should *watch carefully for approaching bed-sores*. If the skin is red and tender, it should be bathed with Condy's fluid, *eau de Cologne*, lemon juice, spirits of camphor, or spirits and water. If a sore is formed, it should be removed from all contact by means of a folded sheet placed above and below it, or, better still, by an air-pillow with a central opening. Horse-shoe pillows are often the best. If a water-bed can be obtained, it

affords the best preventive to bed-sores, by equalising the pressure all over the body.

*Bed-sores are most likely to occur* when the vital powers are low, as towards the end of a tedious fever; or when the nutrition of the part is defective, as through paralysis.

## DELIRIUM.

*Delirium* is a state of deranged mind, in which the intellect and judgment are perverted or lost, whilst the imagination is left without control. Just as in dreaming, the mind wanders on from point to point and there is no power of controlling it, so in delirium the shape of something in the bed-room may suggest something external, which again calls to mind something else, and so the mind wanders on, "dreaming aloud"; the control over the body is, however, not lost, as it is generally in dreaming, so that in delirium patients may even spring out of bed.

Leaving out of question *delirium tremens*, which is brought on by the nervous system being poisoned by alcohol, *delirium* is generally divided into two classes, *maniacal* and *typhoid*, according as the symptoms are strong and furious, or low and nervous.

Delirium generally increases as night comes on, and lessens as morning dawns.

Patients in delirium must be humoured and not actively opposed. Their delusions should be listened to and not contradicted; thus, if a curtain appears to the fevered intellect to be some personal enemy, it is no good to say that it is only a curtain, but if the curtain be shaken and its folds rearranged, and the patient be told that there is no enemy there now, the idea will probably pass from his mind.

Most delirium takes its shape from surrounding objects, and if its cause can be detected by following the direction of the patient's eye, it may often be lessened by rearranging the furniture of the bed-room or otherwise hiding the offending article.

Cloths wrung out of cold water and frequently changed often relieve delirium and induce sleep.

A nurse should never repeat anything of a private or family nature that she has heard from a delirious patient.

## SICK CHILDREN.

*The nursing of sick children* deserves special notice. Most of what has been said about general nursing also applies to children, but in an intensified form and with many additions. Patience, care, and tenderness are more than ever essential with children; from children also do they receive their greatest reward.

*If a nurse is given charge of a young patient, to whom she is a stranger,* she must be careful not to alarm him. On entering the room she should sit down at some distance from the patient and pretend not to notice him. After a few minutes her presence will have become familiar, and she may approach. If the child is asleep she should be especially careful to keep out of the way, so that he may not see a strange face on awakening. In noticing or speaking to the child her manner should be quiet, and her voice gentle and soothing, she must strive above all things to win her patient's love, once that is won her position is secure.

*To find out what is the matter* requires much tact. A young child cannot be questioned, and if he is fretful

he can hardly be looked at. Here must come in the use of that language of signs which cannot be learned except by those who love children.

*The conduct of children when ill* depends mainly upon the way they are treated when well. Mothers who desire to have any comfort at all when their little folk are ill, should remember this: if they have spoiled their children, if they have made domestic remedies unnecessarily nasty, if they have spoken of the doctor and his medicines as bug-bears—their *Nemesis* will come when the children fall sick.

*Symptoms* must never be neglected in children. The bodies of children are frail, and so disease has a dangerous power over them; there also seems to be a closer union between the parts, and so diseases spread rapidly from one organ to another. An apparently trivial symptom may be the precursor of a serious disease, just as an apparently trivial accident may, if neglected, lead to a life-long deformity.

A *flow of tears* need not be minded nearly as much as *tearless crying*, the latter arising more usually from bodily pain than from mental causes. The *cry of hunger* may be recognised by the hand being carried to the mouth, and by the mouth being moved as though drawing in and swallowing food.

*Rolling of the head* on the pillow, especially if the eyes be fixed, and passing the hand over the top of the head, are symptoms that should not be neglected; if not arising from costiveness, advice should be at once obtained.

The *movements of the mouth*, poetically considered the effect of an angel's whisper, are generally caused by

flatulence; change of posture may relieve this, rubbing the abdomen with a warmed hand, or laying a hot flannel on it, are also of use.

There are some diseases of infancy that come on so suddenly, and so soon obtain the master-hand, that everyone having to do with children should have a knowledge of "first aid" in their treatment, a knowledge of what to do *until the doctor comes.*

*Diarrhœa.* In very young children this generally occurs from errors in diet. In children at the breast the mother's diet may be at fault. Giving bread to children before they get their first teeth is a frequent cause of diarrhœa.

During teething diarrhœa seems sometimes to have a salutary effect, and, if it is slight, it should not be checked without careful consideration. The diet should, if necessary, be regulated. If it is excessive, continues too long, or is accompanied with vomiting or much feverishness, advice should be sought. In older children if it arises from errors of diet, a small dose of castor oil or rhubarb may be given.

In hot summer weather advice should be at once obtained.

Strong purgatives should never be given if there are any feverish symptoms. If the case turned out to be an early stage of typhoid fever, the effect of strong purgatives might be absolutely dangerous.

*Croup* is an inflammatory affection of the windpipe. A false membrane often forms, contracting the tube, and so threatening suffocation. It often comes on suddenly, and is ushered in by a peculiar loud, brazen cough. After a time the breathing becomes difficult, and there is

a roughness and shrillness of inspiration. The skin is hot, the face flushed, and there is great thirst. If the disease progresses unfavourably the lips become livid, and there is either an increased struggle for breath or a tendency towards unconsciousness.

*Treatment.* One or two teaspoonfuls of ipecacuanha wine should be given in warm water sweetened; hot drinks must then be given until vomiting occurs. If relief is not obtained, the dose is to be repeated in ten minutes. The child's feet should be put into hot water and mustard, or, better still, the child should be put sitting in hot water, the shoulders being covered with flannel; then a large, thick poultice of three parts of linseed meal and one of mustard should be put on the upper part of the chest and well round the throat.

The room should be kept warm and the air moist; so a fire should be lighted and a kettle placed on it, the steam being conducted into the room by a tube. A roll of paper will do for a tube for a short time.

*Convulsions* are often preceded by contractions occurring in a limb. Drawing in the thumb tightly across the palm of the hand is frequently a warning.

The best *treatment* is to put the child at once into a hot bath, or, if this causes fright and struggling, to apply cloths dipped in mustard and hot water to the feet, legs, and lower part of the body. If the fit is caused by an error of diet, some castor oil may be given as soon as the child can swallow it.

When children are "*out of sorts*" it is not well to be too ready to give them medicine. Constant powders, soothing or aperient, are decidedly injurious. Careful dieting is generally the chief medicine needful in the

trivial ailments of children. Broth may be substituted for meat, bread and milk for cakes and jam, and light puddings for indigestible pastry. Careful bathing, fresh air, and exercise will probably complete the cure.

*Feeling a child's pulse* often causes a struggle. If, however, one finger be given to the child to hold on by, and another laid on the wrist, it can generally be counted. The pulse may also be felt behind the inner ankle or in front of the ear.

*To count the respirations* the hand should be laid on the abdomen.

A child should never be put to sleep with an adult. Not only is there a risk of "accidental over-laying," or more properly "careless suffocation," but pure air is even a greater necessity for children than for the grown-up, and air contaminated by the emanations from another's lungs and skin is injurious. A child in its own cradle or cot can be kept sufficiently warm by an extra blanket or eider-down quilt. For the same reason children should never be allowed to sleep with their heads under the clothes.

### PREPARATION FOR MEDICAL MAN'S VISIT.

*Proper preparation* must always be made for a medical man's visit, in order to save time and to avoid fuss. Hot and cold water, carbolic or other antiseptic soap, and a clean towel should be provided for his hands. If necessary the temperature should have been taken, and all information concerning the state of the patient since the last visit should be ready.

In *surgical cases* if dressings or poultices have to be removed, the new dressing, or the materials for making

the poultices must be ready. Lint, oilsilk, cotton wadding, or anything else required for the case must be at hand. Scissors, needle and thread, and pins should always be in the room.

The preparation needful varies with each case. Observation will tell what has been required before, common sense must supply the rest.

# CHAPTER VI.

## APPLICATION OF LOCAL REMEDIES.

### POULTICES.

In treating of *Local Remedies* we must first inquire why they are used, and what results are expected from them, and then deal with the preparing and applying. To understand their action is of the utmost importance, as such applications have often to be improvised, and to do this successfully it is necessary to know how and why they act.

*Heat is applied locally,* either in a *moist* or *dry* form—most frequently in the former. Poultices and fomentations are the usual forms in which moist heat is applied.

*Poultices* afford warmth and moisture, and ease pain by lessening the tension and hardness of the tissues, which are the chief causes of pain in inflammation.

In *inflammation* very large poultices should be used, and they should be as hot as possible. If applied at the very beginning to inflamed tissues, they often check the inflammation and prevent the formation of matter.

*When matter is formed* they assist its discharge. For this purpose they should be *very little larger than the opening in the skin,* otherwise they have a softening and irritating effect. In some cases, before putting on a poultice, it is well to cover the part with a plaster in

which a hole the desired size has been cut. The plaster keeps the poultice from the healthy skin. If there is much pain, opium plaster may be used.

*Poultices should be changed frequently;* indeed, they cannot be changed too often. Heat, softness, and moisture are required; so as soon as poultices become cold, hard, or dry, they must be taken off. From two to three hours will generally be found to be the extreme time for which poultices will retain the desired qualities.

*To retain its heat* a poultice must be thick: from a quarter to half an inch will generally be found sufficient. It is best spread on cotton-wool, which is light and keeps the heat in; old flannel also does. Whatever material is used, it must be larger than the poultice is to be, and as soon as the poultice is spread the free edges of the material should be doubled down on it. This limits the poultice to a given size, keeps it hotter, and makes it easier to put on and take off.

If a poultice is covered with several thicknesses of flannel, and with either oil-silk or gutta-percha tissue, it will retain heat and moisture much longer than it otherwise would.

In some cases very large poultices are required. In children it may even be necessary to cover the entire chest, front and back. This is called a "*jacket poultice.*" It may be spread on a piece of linen sufficiently large to go round the entire chest, tapes being sewn on to fasten in front and over the shoulders. A jacket poultice can also be fastened on with two Esmarch triangular bandages, the long edges running over one shoulder and under the other armpit, the corner going under the second armpit. The back bandage should be put on first. The bandages are, of course, made to cross in different directions.

*Before making a poultice* the patient should be got ready. If another poultice has to be removed it should be taken off, the part sponged and covered up warmly. If there is a wound it should be washed and lightly covered. The poultice should then be made rapidly, brought to the bed-side, and put on as hot as the patient can bear.

*The poultice should be carried* on the palm of the left hand, and the lower end placed against the patient; it should then be turned up into its proper position. Care must be taken in doing this not to scald the skin.

*Especial care must be taken in putting poultices on children.* The skin is more tender, and they are easily frightened. It is sometimes well to lay a handkerchief, or even a piece of flannel, between the poultice and the skin. This can be slipped away when the child is accustomed to the heat.

*In taking off a poultice* it is well to begin at the top and then turn it in as it is removed, gently pressing against the skin. It should be removed in one piece, without any being left sticking to the skin, or without it being allowed to fall about the bed. Sometimes, however, this cannot be done: a good deal depends upon the kind of poultice, how it is made, and how long it has been left on. A bread poultice is more likely to fall in pieces than a linseed one.

*Linseed poultice.*—A basin is to be scalded out, and sufficient boiling water poured into it. The linseed meal is then to be added with the left hand, being sifted between the fingers. It is to be well worked, and when it is light and free from stickiness, and cuts clean, a little linseed, olive, or castor oil is to be stirred into it.

It is then to be spread on cotton-wool, well pulled-out tow, flannel, or a piece of old blanket.

*Bread poultice.*—A basin is to be scalded out and some boiling water poured into it. Then coarsely crumbled bread is to be added, the mixture being well stirred. The basin is then to be covered with a plate and left before the fire for about five minutes. The superfluous moisture is to be drained off, and the poultice is ready for spreading. If not hot enough, more boiling water may be added, and almost immediately drained off.

A bread poultice can be made much more soothing by substituting boiling *milk* for the water.

A *charcoal poultice* may be made by adding powdered wood charcoal to either a bread or linseed poultice, or to one made of both of these materials mixed. From $\frac{1}{4}$ to $\frac{1}{2}$ an ounce of charcoal is generally sufficient. It is best to stir half the charcoal into the poultice, and to sprinkle the rest of it on the surface. Charcoal poultices are generally used for unhealthy or foul sores. Charcoal has the power of absorbing evil-smelling gases.

*Mustard poultices* can be made of any strength. They are generally made by working equal parts of mustard and linseed meal into a paste, with hot, *but not boiling*, water. If they are wanted very strong, the quantity of linseed meal may be lessened or even entirely omitted, mustard and cold water being used alone. If a milder effect is desired, as in the case of children, or when the poultice is to be left on for a considerable time, two, three, or even more parts of linseed meal, may be used to one of mustard.

Mustard poultices should be covered with muslin; all other poultices should be applied directly to the skin.

*Starch poultices* are made by blending the starch with a little cold water, and then adding boiling water. When of the proper consistence, the poultice is to be spread and applied. A starch poultice is perfectly unirritating, and so cannot be surpassed as a soothing application. It also retains heat very well.

Poultices made of *poppy heads and chamomile flowers* used to be greatly used as soothing applications. The poppy heads were boiled until quite soft, and then the seeds were removed and the heads broken up and mixed with the chamomile flowers, which had also been boiled.

Poultices can be rendered *anodyne* (or pain-killing) by being made with water in which poppy heads have been boiled, or by being sprinkled over with laudanum.

Linseed and mustard-leaves make very good poultices. They fit into a small space, and are easily and rapidly prepared.

## FOMENTATIONS.

*Fomentations* have almost the same action as poultices. They are often used alternately with poultices. They have the advantage of being lighter than poultices, and so are better borne on tender surfaces. They are made by pouring boiling water over flannel, and then wringing the flannel out, shaking it up, and applying it. They are to be covered with oil-silk and fastened on with bandages. If wrung as dry as possible there is very little fear of scalding or blistering, no matter how hot the flannel is.

The "*wringing*" can be done in an ordinary towel, but it is easier to do it by means of a "round" towel. The flannel is placed in the centre of the round towel in a basin, and boiling water is poured over it. Sticks are

passed through each end of the towel, the centre is raised, the sticks twisted in opposite directions, and so the flannel is wrung out.

An ordinary towel will also do. It is spread over a basin, the flannel is placed upon it, and the boiling water is poured in. The towel is then folded over the flannel, it is lifted out of the basin, and the two ends are twisted in opposite directions until the flannel is squeezed dry.

The flannel is "*shaken up*" in order to let the air into its substance and folds. Air being a bad conductor of heat, this causes the fomentation to retain its heat much longer than it would otherwise have done.

If poppy heads have been boiled in the water the fomentation will be more *anodyne*.

*Spongio-piline*, being porous at one side and water-proof at the other, does excellently for fomentations.

Twenty or thirty drops of *Turpentine* sprinkled on either the flannel or spongio-piline is a good counter-irritant. It is often used when the abdomen is distended with air.

As fomentations rapidly become cool, they must be frequently changed. When they are finally removed the skin must be dried and covered with flannel to prevent catching cold.

### DRY HEAT.

*Dry heat* is applied when warmth is necessary, and it is desired to avoid the relaxation of the tissues caused by moisture. Flannel heated before the fire or in an oven is used. Also sand or bran sewn in flannel bags, and heated in an oven. Chamomile flowers can also be used, and are lighter than sand. A flat tile heated and wrapped in flannel retains its heat for a long time.

One of the commonest ways of using dry heat is to apply tins, jars, or bottles of hot water to the feet. They ought to be wrapped in flannel to prevent the skin being injured. Too great heat ought not to be applied to the unconscious or paralysed.

### BLISTERS.

Cantharides, or Spanish fly, is the general basis of *blistering preparations*. (The name Spanish fly is misleading, the insect in question being really a *beetle*, and a native of *Hungary*. When applied to the skin it causes tingling, smarting, and a sensation of heat; soon the "true skin" becomes congested, and an oozing takes place. The minute drops of serum enlarge and coalesce, forming different-sized blebs. The outer skin, or epidermis, is, of course, raised up by the fluid.

As a rule, blisters are applied as counter-irritants, and for this purpose redness and a minimum amount of vesication are desirable. Extensive vesication should never be employed unless for some special object, as the contents of the vesicles is very similar in composition to blood, and it is found in practice to be as weakening as though the same amount of blood had been withdrawn.

*The effect of counter-irritation* may be shortly explained. It affects the nerve endings, and through them causes an impression to be brought by the nerve fibres to some portion of the brain. This causes another impression to be carried by other nerve fibres, either to the spot where the counter-irritant was applied, or to some other portion of the body which receives nerves from that part of the brain.

Thus we find that irritating the skin may have an

effect on the brain. This is seen in some cases of coma, where consciousness is aroused by blisters applied to different parts of the body in rapid succession, and for a short time each—"flying blisters."

We also find that it may have an effect on some other part of the body. Thus a blister in one situation may ease pain in another. And fortunately we have a simple rule which helps to show where to make these applications. The nerve that supplies a joint or muscle also supplies the skin over it, so a superficial application generally affects the tissues beneath.

The common preparation of cantharides is a thick plaster. A piece, the required size, may be cut off a sheet, or some may be spread on sticking-plaster, a margin of the latter being left to fasten the blister to the skin.

*Blistering fluid* is convenient, clean, and efficient. It is painted on with a camel's hair pencil. The amount put on and the delicacy of the skin will regulate the effect.

A small blister can be readily made by putting some cotton-wool into a silver thimble and pouring on it a few drops of strong solution of ammonia. The thimble is then to be inverted on the skin, and kept there for ten minutes. By this time a blister will have risen.

*Counter-irritation* by mustard, iodine, or croton-oil liniment, may often take the place of blistering.

*The dressing of a blister* deserves careful attention, as careless or ignorant handling may cause severe suffering. Unless specially directed to the contrary, a blister should *not* be opened, but be covered with a layer of soft cotton-wool till the effused serum is absorbed. Even if the blebs are too large to admit of absorption, it is important

to preserve the covering until the true skin has had time to form a new epidermis. The nerve endings (a touch to which causes such exquisite agony) are thus protected, and the risk of ulceration is lessened. Allowing the air to reach the raw surface may, in persons of weak constitution, cause inflammation, ulceration, or even death.

When desired to open the blister, it is best to prick it with a fine needle, and allow the serum to ooze slowly out. The vesicle should not be squeezed. Very large blisters may sometimes be nipped with a pair of scissors. The fluid should always be caught in a vessel or on soft rags, to prevent it irritating the neighbouring skin.

When the fluid has nearly ceased coming, some simple dressing or fresh lard is to be spread over a piece of lint or soft linen, laid gently on the blister and secured with strips of sticking-plaster. Cotton-wool will also do as a dressing.

### OINTMENT.

*Ointments* are composed of some fatty matter, and are sometimes used plain, for softening and lubricating the skin. Generally, however, some powder, solution, or soft extract is rubbed up with some greasy basis, and it is the action of this additional principle that is desired.

*Vaseline* has lately been much used, both for its own action and as a basis for other remedies. It is superior to lard, as it does not become rancid, and is not greasy.

Ointments are *spread* on lint or soft linen, and are *secured* either by bandages or strips of sticking-plaster.

### LEECHES.

*Leeches* are used for the removal of blood. Their effect is more local and less constitutional than that of

general bleeding. They have a better local effect than cupping, and can be used in many cases of acute inflammation, when cupping would be too painful.

*The medicinal leech* is rare in England, the greater number of those used coming from the south of Europe. It is three or four inches long, and has a soft, elongated, oval body, terminating at either end in a sucker. It moves with considerable rapidity by elongating and contracting its body; laying hold with the anterior sucker it draws up its body, and fixing the posterior sucker elongates itself again. The anterior sucker contains the mouth, which is furnished with three small, white, hard teeth, the edges of which are serrated. The teeth are set in a triangle, and their edges are curved so as to form minute semicircular saws; to the teeth powerful muscles are attached.

*The mechanism of a leech-bite* is simple. The sucker having laid hold, the muscles attached to the teeth commence acting, and soon cut through the skin. This is done so rapidly by the sharp teeth that hardly any pain is felt. The suction causes the blood to flow rapidly. As the teeth cut the true skin the marks of leech-bites are never lost. An average-sized leech abstracts about a teaspoonful and a half of blood.

*In putting on leeches*, a bony surface, or some part where pressure will stop the bleeding, should be selected when possible.

*Before putting on leeches* the part is to be washed with warm water and well dried. It is better not to use soap, as it may prevent the leeches biting.

*In applying* leeches they may be put into a chip-box and held against the skin, the edge of the box being raised from time to time to see if they have bitten. If

the leeches are to be applied to a flat surface, they may be put into a wine-glass of water, the top of which is then to be covered with a piece of note-paper. The glass is then to be inverted on the desired place, and the paper slipped out without allowing the water to spill. The leeches, being in their natural element, will soon bite. When *all* have done so, a towel is to be placed where it will soak up the water, and the glass is to be lifted off.

Gently squeezing a leech's tail sometimes *induces it to bite,* as it has to lay hold with its anterior sucker in order to remove its tail from the pressure.

Rubbing a little cream on the skin, or scraping it with the point of a needle so as to show a trace of blood, may also cause leeches to bite.

When a leech has to be placed on some particular spot, it is put into a *leech glass,* or tube tapering to one extremity and ending in a small hole, through which the leech can bite. It is well to be sure that the leech is *not* placed in the glass *tail foremost.*

When leeches have to be applied to the inside of the mouth they are secured by a thread. If they are *swallowed,* an emetic of salt and tepid water is the best treatment.

When a leech has taken its full complement of blood it will generally fall off; if it is desired *to remove it* sooner, it must not be pulled off, as this might leave the teeth in the skin, and so give rise to a troublesome sore. A pinch of salt placed on its body will make it drop off.

The *bleeding* has generally to be *encouraged* by a linseed poultice. If it continues too long it may be *stopped* by pressing a finger for a few minutes to the bleeding spot. A compress, small piece of cotton wool, or the

fluff off a blanket, will also generally stop it, by entangling the fibrin of the blood, and so leading to the formation of a clot. If these means fail, a little cone of lint may be inserted into the bite and secured firmly with a pad and bandage.

Leeches are not now used as much as formerly.

### INHALATIONS.

The word *inhalation* is applied in medicine to the breathing of steam or vapour. The steam may be plain or medicated. Many ingenious inhalers are sold, but, although often more convenient, they are hardly more efficacious than the following improvised one:—

Boiling water is to be poured into a jug, round the edge of which a towel folded into a circular shape is placed. The patient is to lay his face on the towel and inhale the steam.

A teaspoonful of vinegar added to the water is the simplest *medicated* inhalation.

### PADDING SPLINTS.

*Pads* are quickly and easily made out of one or two thicknesses of cotton-wool. Small cushions are often used. Pocket-handkerchiefs, or tow—well pulled out—will do. Newspapers and straw are suitable as temporary expedients. An *extemporary padded splint* may be made by wrapping a walking-stick or piece of wood in a cape or small shawl. A capital pair can be made thus by folding a shawl to a convenient size, wrapping a piece of stick in each end, and rolling the ends until they almost meet in the middle. The injured limb is then to be placed between the rolls (the centre of the shawl forming a rest for it), and a couple of handkerchiefs are to be tied round the limb and rolls, securing all together.

Pads must always be made *larger than the splints* they have to fit upon, and must project at all sides, so that none of the edges of the splints may touch the skin.

The pads must be *arranged* with regard to the contour of the limb, so as to exert proper pressure along its length. No direct pressure is permissible on bony prominences; at superficial joints, such as the knee, the pads must be thicker above and below, so as to prevent pressure on the bone where it is only protected by the skin.

The best way to form an extemporary pad for a splint is as follows:—

Lay the splint on two thicknesses of cotton-wool and cut round it, leaving an inch free all round. Lay the cotton-wool on the splint so as to project an inch all round. Take three strips of plaster, warm them, and lay their centres on the cotton-wool—one at the top, another at the bottom, and the third in the middle—bringing the ends round the splint and fastening on its back. The pad is thus firmly bound to the splint and cannot slip.

## MANAGEMENT OF CONVALESCENTS.

During *convalescence* a nurse's capabilities have full scope. The body and mind are weak and worn, and have to be restored to strength and vigour, and constant foresight and care are required. The following points must be especially attended to.

*Food.*—More food is required during convalescence from acute diseases than in a state of health, as the body has not to be kept *at a particular weight*, but has actually to *increase in weight*. At the same time the digestive system is weak, and so the food must be such

as can be easily digested, and must be carefully administered. Soups, milk puddings, bread and butter, and similar light foods should be given every three or four hours, and indigestible foods should be entirely avoided. It is important not to leave too long an interval between meals, as exhaustion so soon comes on; but, at the same time, continual "nibbling" at food must not be allowed. Beef-tea and arrowroot are not sufficiently nutritious to be of much use in convalescence.

The *clothing* must be warm and comfortable, for "catching cold" is one of the most frequent causes of delayed convalescence, or even of relapse. The extremities must be especially well protected.

Sufficient *rest* must be taken. At least nine to ten hours' rest will be necessary at night, and lying down for a short time after each meal is sometimes of service.

*Variety* lessens the tedium of convalescence and hastens full recovery. When a patient is recovering from an infectious disease, and has been a long time isolated, the slightest variety, such as a fresh bow of ribbons or other slight change in the nurse's dress, or altering the position of the furniture or pictures in the room, is of interest.

Sometimes during convalescence matters come to a *standstill*, and progress seems to cease. It is then that variety is most important; and, if an entire change of scene cannot be managed, changing into another room—even for meal-times—will act as a stimulus to making a fresh start towards health.

A convalescent must be *amused*. This is easy, as even puerile amusements are generally acceptable. Thus scrap-books, picture-books and puzzles, watching

another at work, or hearing a simple story read, often makes the time pass pleasantly.

Some diseases have *special dangers* in the convalescence stage. Thus, after typhoid, even slight errors of diet may cause a fatal relapse, and so meat should not be given until ordered by the doctor. After scarlatina there is a peculiar danger from cold, and so the patient should be well protected by flannel; the slightest appearance of dropsy must also be immediately reported. Paralysis often occurs after diphtheria.

The *part affected* must to a great extent guide the treatment during convalescence. For example, if the lungs or throat have been affected, special precautions should be taken against anything likely to give cold; or, if the stomach be affected, the dieting will require special attention and care.

## PERSONAL AND FAMILY HYGIENE.

Under the heading of *Personal and Family Hygiene*, it will be only possible to deal shortly with a few of those important points, the care or neglect of which so often turns the balance in favour of health or disease.

*Dwelling.*—A house should be perfectly *dry*. Damp should neither rise in the walls nor come through them. Thin porous walls that admit damp should be cemented. The roof should be sound, and the gutters and rain-pipes clean. Dampness of the basement may be caused by a leaking drain or rain-pipe, by slop-water being thrown out too near the house, or by dampness of soil. In the latter cases the floors should be excavated, and relaid with spaces beneath to admit of a current of air.

A *sunny aspect* is a great preventive of illness.

The *drainage* should be in order, and no one should

go into a house without having all the traps and drains inspected by a *competent* man, and this inspection should be repeated. In dry weather water should be frequently poured down all traps, and carbolic powder or chloride of lime should be thrown occasionally on them. Disinfectants should always be employed when the closet is used. The exit drain *from the house* should always be trapped and ventilated by a large pipe reaching to the roof. The overflow pipe of a cistern should discharge over a trap, and *never open directly to a drain*, lest sewer gas should pass up it and be absorbed by the water.

The *entire house* must be *kept clean*, not only those parts of it which meet the eye of a visitor, but the insides of cupboards, servants' rooms, &c.

The old wall-papers should be torn off before new ones are put on.

*Fresh air* is absolutely necessary to health. In *bedrooms* at least 600 cubic feet of air should be allowed for each adult, and children require space in proportion. When the room is of proper size, the air will need renewing, and so the top of the window should be open day and night, and the chimney free.

In *sitting-rooms* purity of air is also important. In the rooms chiefly occupied by the members of the family, gas should never be used unless there is a special opening in the ceiling to allow the products of combustion and the air that is fouled to escape. A "duplex" lamp is far more wholesome than gas, and is very little more trouble.

*Air should be admitted* by the top of the windows, or by ventilating tubes or valves, and *not by the door*, as that causes a "suck of air" from the basement, and sometimes even draws sewer gas past the drain traps. Much

of the lassitude and liability to illness that are such features of modern life are due to the unpardonably neglected state of the air of the houses.

*Cleanliness.*—The entire body should be washed daily with cold water, and dried with a towel rough enough to cause considerable friction. A hot soap bath should be taken weekly. The teeth should be well brushed after each meal, and at night. When the hands have been washed in warm water they should be dipped into cold water; this closes the pores, takes away the liability to chill, and prevents the hands becoming soiled as soon as they otherwise would.

*Clothing* should be warm and light. Muffling up is injurious, but so is the other extreme of defying the weather, and those whose chests are weak must be careful not to run the slightest risk of cold. As a rule, however, cold baths and brisk exercise keep off the cold more effectually than mufflers. Flannel is always good next the skin, but it is especially so if there is any predisposition to rheumatism or catching cold.

The evil effects of injudicious clothing are most seriously felt by females. Pressure on the shoulders and lower ribs lessens the freedom of the respiratory movements, injures the vital powers, and predisposes to consumption. The abdominal organs are also often seriously displaced, and curvatures of the spine result, from the muscles of the back wasting in consequence of being prevented performing their natural function of supporting the back. High heels strain the ankles, lessen the power of the muscles of the calf, and disturb the balance of the body. They also cause fatigue, similar to that which is felt going down a steep hill. The boots generally worn (and which are apparently built on the theories

that there are nearly equal arches inside and outside the foot, and that the great toe is the centre toe) are the direct cause of bunions and lameness. Parents have a heavy weight of responsibility in deciding whether their children are to grow up healthy or unhealthy, and too often neglect it, bringing sorrow and suffering on succeeding generations.

*Food* should be taken *regularly* and at proper intervals. Meal-times should be fixed and adhered to. Growing people should have meals about every four hours during the daytime, and so require four meals. Those who are further advanced in life often find three meals a day sufficient. The morning meal should be taken before work is commenced. The mid-day meal should be ne heaviest.

Food should be taken *slowly*, and never "bolted," and no violent exercise should be taken immediately afterwards.

The *quality* of food is important. It is necessary to take nitrogenous food, some sort of fat, sugar, or starch, water, and various salts. The nitrogenous foods are generally called "tissue-formers," and fat, sugar, and starch "heat-givers." Milk contains the proper proportion of each class of food, and as those who work hard require solids, oatmeal may be looked upon as nearly a perfect food, containing as it does heat-givers and tissue-formers in almost exactly the proper proportions. A very prevalent and most uneconomical error is depending so much upon meat for the needful supply of nitrogen. Oatmeal, lentils, pease, and haricot beans are all very rich in nitrogen, and many other vegetables contain a considerable proportion, and that more cheaply than meat. So that, although meat is of great use as a

food, it should not be so entirely depended upon. Dr. Parkes kept a soldier doing hard work on 1¾lbs. oatmeal and two pints of milk a day, at a cost of nine-pence, in perfect health, and at a constant weight. Bacon will supply some of the necessary fat for those who cannot afford to buy so much milk. Meat soup, with oatmeal in it, and bread is also a capital diet.

"Wholemeal" bread is much more nourishing and wholesome than either white or the common brown bread.

The *quantity* of food taken should depend upon the amount of work done and heat formed, so that in cold weather, and after active exercise, food should be increased in quantity, and *vice versâ*.

If no stimulants or condiments have been used, it is generally right to eat until the appetite has been satisfied.

*Drinks.*—Two to three pints of water are necessary daily for adults. Some of this is taken as a drink and some in food. Tea and coffee are useful adjuncts, and unless taken in excess are harmless. Fluid should be taken at the end of meals, and not at the commencement.

Tepid drinks generally slake the thirst most effectually, as they soften the mucous membrane.

During hard work oatmeal and water (boiled together), buttermilk, and cold tea or coffee with plenty of milk, form the best drinks.

*Alcohol* should never be taken except as a medicine, and then only under medical orders. In excess, whether taken in the form of wine, beer, or spirits, it over-exerts the heart, alters the blood-corpuscles, paralyses the nerves, and consequently checks the circulation through

the capillaries, hardens the tissues, and cools the body; particular organs are also injured, as the brain and liver.

Whilst alcohol taken in large quantities has these effects to a marked degree, it is probable that the same results always happen, but in a slighter and less marked degree, as the amount taken is lessened; so that in health alcohol should never be taken. Its use in disease is purely a question for medical men, but it should only be taken as a medicine for as long as it is ordered. Too often stimulants are continued long after all other medicines have been discontinued.

Alcoholic drinks are not useful as foods, the amount of food elements they contain being small and so very expensively bought. It also seems certain that much of the alcohol itself is not used up in the body at all, but that, after acting as an irritant and narcotic, it passes out as it entered in, without having been burned.

Stimulants taken *at night* are injurious, as they excite the heart just as it ought to slacken off for rest.

Stimulants are least injurious when largely diluted and taken with food.

*Sleep.*—From seven to nine hours of sleep is generally required. For the sleep to be *sound*, neither the mind nor any particular organ of the body should be specially engrossed; thus a student should spend half-an-hour before going to bed in conversation or at light literature. So also the final meal should be taken two or even three hours before bed-time, and should be composed of light and easily-digested food. Fresh air, a fairly hard mattress, and not too heavy bed-clothes are all important factors in securing a good night's rest.

*Exercise.*—Any part not used gradually wastes, so all the muscles of the body should be regularly exercised.

Walking chiefly exercises the muscles of the lower part of the body, but swimming uses them all. Many games afford capital exercise, and should be played by *girls* and boys alike.

*The clothing should never be allowed to interfere with the movements of the body.* A great reform is wanted in this respect for girls.

Woollen clothes are much warmer, weight for weight, than cotton.

*Gymnasia* are very useful, but they should be used for general and regulated exercise, rather than for attaining proficiency in some particular feat. It is important to *gradually work up*, and not to begin with anything requiring much muscular exertion. Periods of rest should alternate with periods of exertion.

The narrow chest and ill-developed muscles that result from neglect of proper exercise in early manhood is the strongest argument in favour of compulsory military service.

*In conclusion.*—Morality, cleanliness, temperance, regularity, exercise, sleep, wholesome and sufficient food, pure water, fresh air, and proper clothing, are all in favour of health, whilst the opposites, such as intemperance, irregularity, want, and luxury are against it. All classes are afflicted with diseases, arising from the facts and prejudices of their surroundings, many of them being altogether avoidable. The *poor* would do well if they would give up spending money on drinks which only give temporary and deceitful stimulation, and spend it instead on improved homes, food, and clothes. The *rich* would do well if they would remember and act on Dr. Abernethy's advice—"If you wish to be healthy, *live on sixpence a day, and earn it.*"

# CHAPTER VII.

## THE ROLLER BANDAGE AND ITS APPLICATION.

By ROBERT J. COLLIE, M.D.

### THE ROLLER BANDAGE.

ROLLER bandages may be bought ready made of different materials, linen, calico, web, gauze, &c. They can, however, be easily made by tearing strips, $2\frac{1}{2}$, 3 and 4 inches wide, from a piece of calico 6 yards long, taking

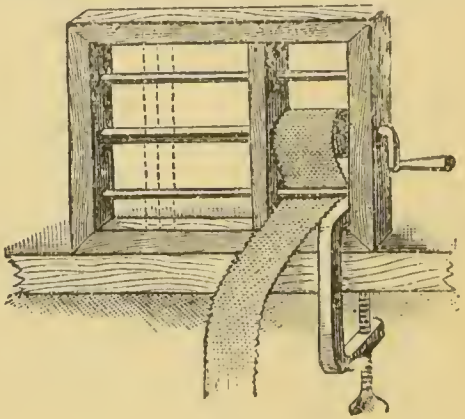


FIG. 12.

*Designed by A. C. Tunstall, M.D., Lecturer and Examiner to the Association.*

To be had from the St. John Ambulance Association.

care to remove the selvedge. These strips are then firmly and uniformly wound up into rolls, either by the fingers or by means of the winding machine shown in Fig. 12

GENERAL RULES.

1. The bandage must be tightly rolled up before its application.

2. Begin by placing the outer surface of the roll next to the skin, in order that it may readily unwind.

3. Never unroll more than two or three inches of the bandage at a time, and if by accident more is unrolled, roll it up before proceeding.

4. Always commence by making a couple of turns round the limb to firmly fix the bandage.

5. Bandage from below upwards.

6. Bandage from within outwards over the front of the limb.

7. Each turn of the bandage should, as a rule, overlap two-thirds of the preceding one.

8. In reversing, the turns should be kept parallel and at equal distances apart, and downwards towards the extremity of the limb.

9. Always form a figure of 8 at a joint.

10. Apply the bandage firmly or it is useless. If the edges turn up on running the hand down it, the bandage is too loose.

11. The bandage must not, however, be made excessively tight, as the circulation may be impeded or even stopped.

12. The pressure must be equally applied throughout. If on removing the bandage red lines are found on the skin, it is an indication of unequal pressure produced by the edges.

13. Fix the bandage securely at the end by pinning it.

14. Never attempt to re-apply a bandage without first completely winding it up. This should be done firmly and evenly, otherwise it is impossible to apply it properly to a limb.

15. In taking off a bandage, gather the slack into a loose bundle and pass it round and round.

### METHOD OF APPLYING THE ROLLER BANDAGE.

There are three methods of applying the roller bandage : —

1st. The Spiral.

2nd. The Reverse.

3rd. The Figure of 8.

*The Spiral* is made by simply encircling the limb with the bandage, each circle being made to cover two-thirds of the preceding one.

This method can only be applied where the part to be bandaged is of a uniform thickness, as for instance the finger and a short portion of the forearm immediately above the wrist.

*The Reverse.*—In applying the spiral bandage a point is always reached where the increasing thickness of the limb makes it impossible to tighten the lower edge; this difficulty is got over by applying the thumb or forefinger of the disengaged hand to the lower edge of the spiral about the centre of the outside of the limb and turning the bandage downwards upon itself with the other hand, and then drawing the bandage tight; it will now be seen that *both* edges firmly embrace the part. The bandage is again made to encircle the limb, and a second reverse is made in line with the first, but on a slightly higher level

These reverses are continued as often as necessary.

*The Figure of Eight.*—Where the surface is so irregular that neither the spiral nor the reverse is admissible, as for instance at a joint, the bandage is applied in a series of loops forming, as its name implies, a figure of eight.

### THE FOREFINGER.

Take a hank of broad tape three-quarters of an inch wide, and wind it tightly into a roll.

Place the hand palm downwards. Commence at the root of the thumb, and, leaving a free end of three or four inches, carry the roller across the back of the

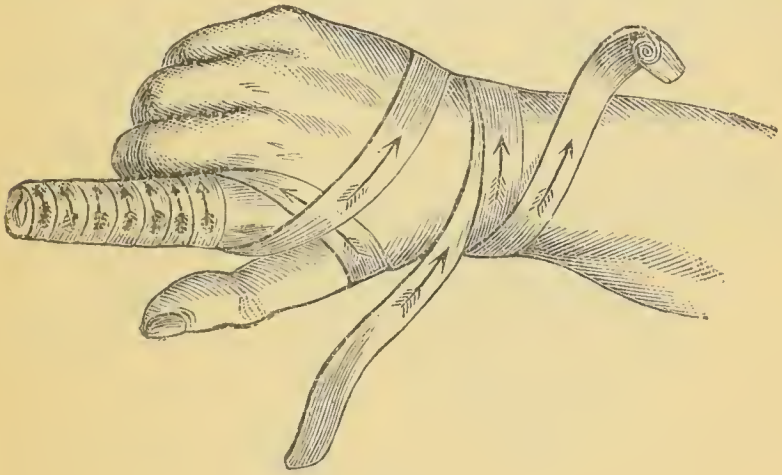


Fig. 13.

wrist, encircling it twice in order to fix the bandage. Now take the roller up the back of the hand from the root of the thumb to between the first and second finger, and by one large spiral to the tip of the fore-

finger, which is then covered by a series of spirals from tip to root, each turn overlapping two-thirds of the preceding one. When the root of the finger is reached, the bandage is carried across the back of the hand to the ulna side of the wrist, and fixed by tying it in a reef knot to the loose end previously left for the purpose.

The other fingers are bandaged in the same manner. If more than one is to be bandaged, a turn round the wrist should be taken before commencing the second.

### SPICA FOR THE THUMB.

Take a hank of broad tape three-quarters of an inch wide, and wind it tightly into a roll.

Place the palm of the hand downwards. Take two turns round the wrist, commencing at the root of the

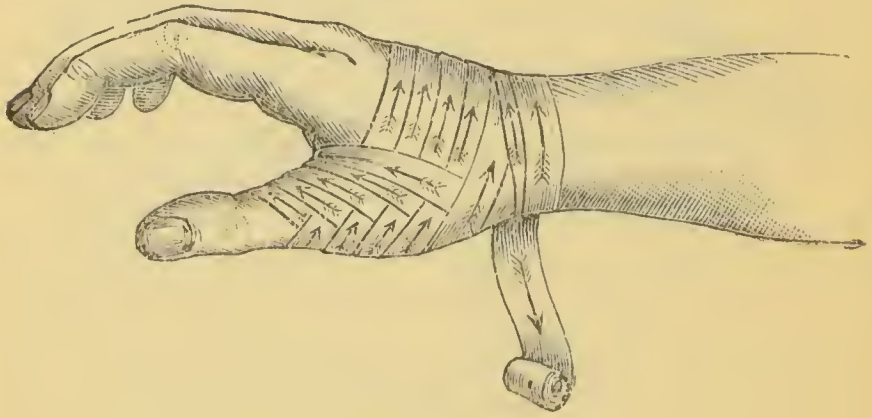


Fig. 14.

thumb and going across the back of the wrist to fix the bandage. Now carry the roller upwards from the root of the thumb to between the thumb and the forefinger,

encircling the thumb at the first joint. Take the bandage across the back of the hand and round the wrist, bringing it back to the root of the thumb. Carry it up and again encircle the thumb, covering two-thirds of the former loop; then take it across the back of the hand and repeat these turns round the wrist, and the loops round the thumb, each at a lower level than the preceding one, until the thumb is covered.

### HAND AND FOREARM.

To bandage the right hand, take a $2\frac{1}{2}$ inch roller bandage and make a couple of turns round the wrist, com-

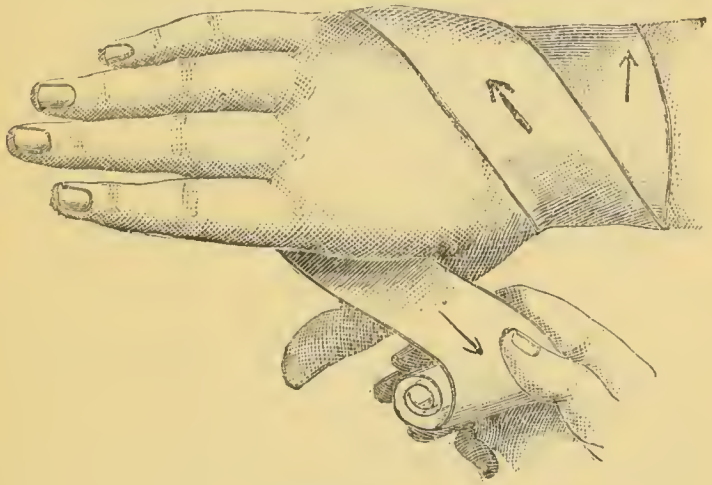


Fig. 15.

mencing at the root of the thumb and passing outwards over the back of the wrist. Carry the bandage upwards and outwards over the back of the hand to the root of the little finger, take it across the palm, in which has

been placed some cotton-wool, and bring it up between the thumb and the root of the forefinger. (This is the position shown in Fig. 15.)

Carry the bandage over the back of the hand to the ulnar side of the wrist, and encircle the wrist and hand

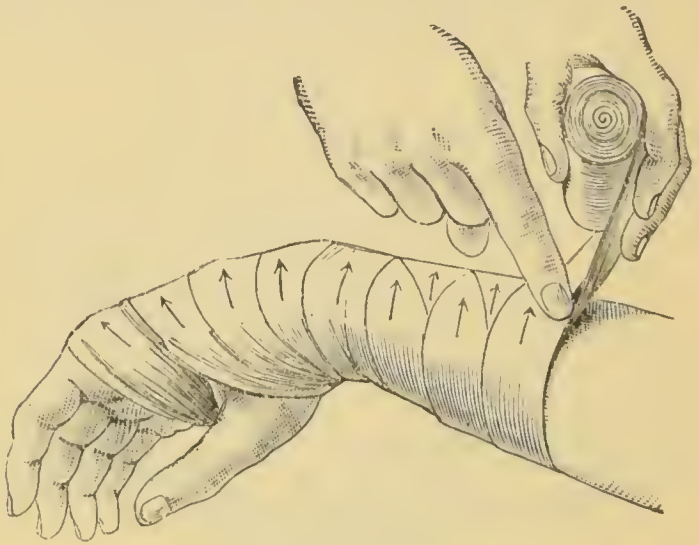


Fig. 16.

as before, this time, however, covering the former turn and the roots of the fingers.

When the hand is sufficiently covered by these turns, the forearm is bandaged by a few spirals until the increasing thickness of the arm necessitates a series of reverses which should be kept in line on the back of the forearm.

### THE ELBOW.

When the bandage reaches the elbow, which should

be bent, it is made to encircle the joint by carrying the roller once horizontally round the centre of the joint without reversing, taking care to apply the centre of the bandage over the bony prominence on the outside of the elbow.

The bandage is now carried round from within outwards, at a somewhat lower level than the horizontal turn, and by encircling the arm at this part, makes the lower loop of the figure of eight. The bandage is now brought round the joint at a slightly higher level than the horizontal turn, thus completing the upper half of the eight.

These figures of eight are then continued, the loops being taken above and below the horizontal turn until the joint is sufficiently supported.

### THE ARM.

The arm is bandaged by a series of spirals and reverses as in the forearm, until the shoulder is reached.

### SPICA FOR THE SHOULDER.

To apply a spica bandage to the left shoulder, take a roller bandage thirty feet long, and make two turns from within outward round the left arm about four inches below the shoulder in order to fix the free end.

Carry the bandage up the arm to the back of the left shoulder, across the back, under the right armpit (in which a pad of cotton-wool has been placed), and thence obliquely across the chest to the starting point on the left arm.

Encircle the arm half an inch above the lower edge of the first turn, and repeat the turn across the back and chest.

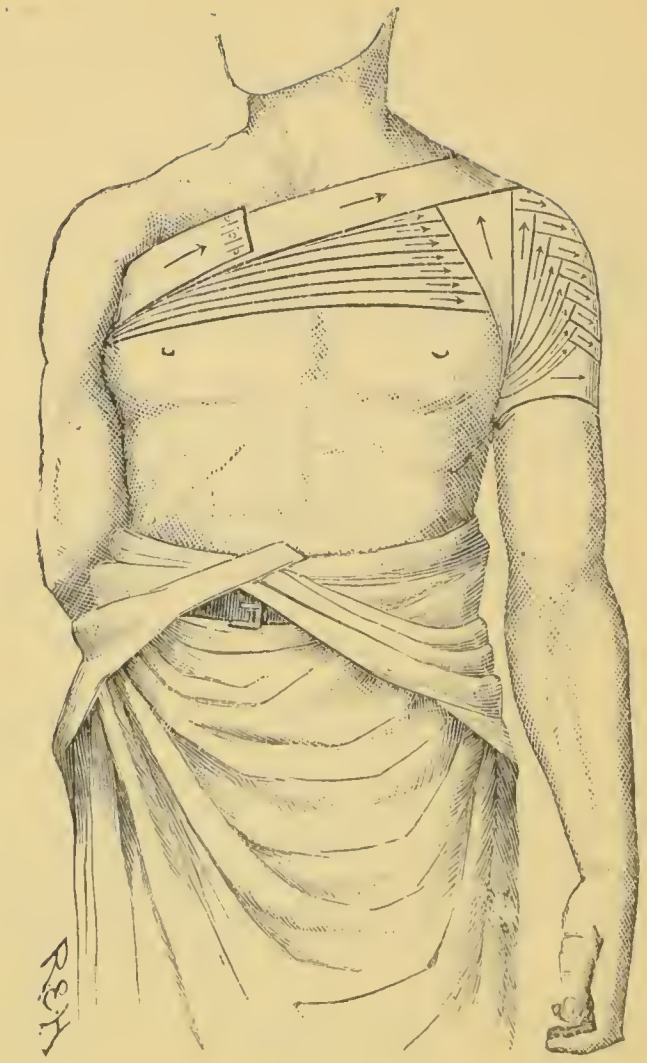


Fig. 17.

Continue to encircle the arm and the body in this manner, taking care to make each turn half an inch higher than its predecessor, until the shoulder is covered as shown in the illustration. The bandage is finished by pinning its end to the last turn in front of the chest.

The lower edges of the bandage will make a series of inverted "V's" where they cross each other on the outside of the left arm. To apply this bandage to the right shoulder follow the foregoing instructions, reading "right" for "left," and *vice versâ*.

### THE LOWER EXTREMITY.

To bandage the right foot, ankle, leg, and thigh, take the head of a 2½ or 3 inch roller bandage in the left hand and apply the free end over the inner ankle bone, carry it across the instep to the root of the little toe, and take it beneath the foot to the ball of the great toe. Bring it up over the instep and the outer ankle bone, round the back of the leg a few inches above the heel overlapping and fixing the commencement of the bandage.

It will thus be seen that a figure of eight turn round the foot and ankle has been made, and this turn should be repeated in order to more firmly fix the commencement of the bandage.

When the bandage again reaches the foot of the little toe a spiral is made round the foot at that level, and as the surface is irregular, a reverse must be made in front, at the centre of the roots of the toes.

These spirals and reverses are then continued until the ankle is reached, when another figure of eight is made round the ankle and foot, thus bringing the bandage above the ankle.

The small of the leg is now covered by three simple spirals, and, as the leg increases in thickness, a series of spirals and reverses must be made until the knee is

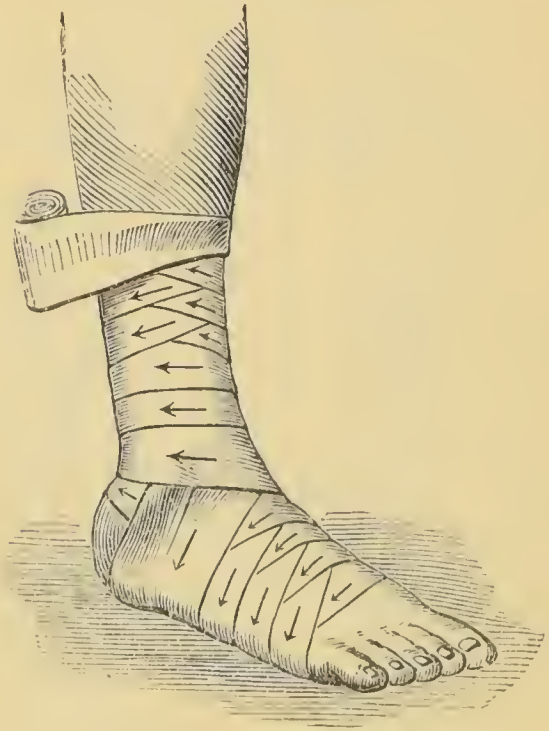


Fig. 18.

reached, when the figure of eight is again resorted to in order to surmount the joint.

The bandage is continued up the thigh by a series of spirals and reverses, as in the leg bandage, and fastened at the hip by a spica.

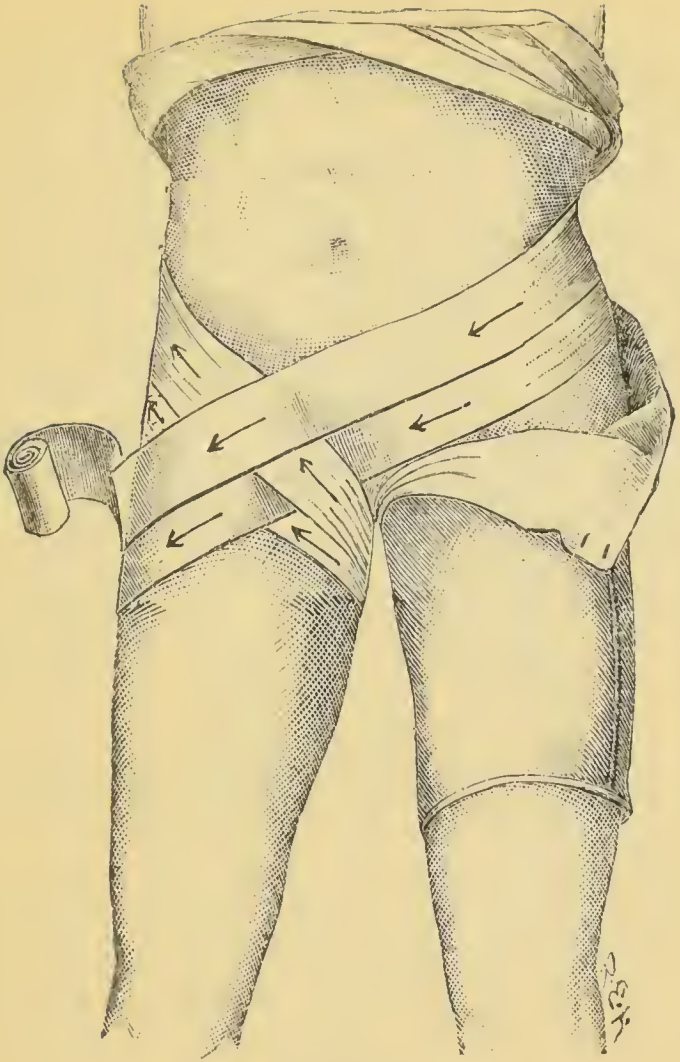


Fig. 19.

### SPICA FOR THE GROIN.

To apply a spica bandage to the right groin lay the free end of the roll along the right groin, *i.e.* at the junction of the thigh with the abdomen. Carry the bandage outwards and upwards to a little above the right hip joint, then across the small of the back, bringing it round in front to the right groin again, where it should cross the former fold.

The bandage is now made to encircle the upper part of the thigh, and is brought out in front between the thighs and carried upwards half an inch above the lower edge of the first turn round the body.

Repeat these turns, making each half an inch higher than the preceding one, until the wound is covered. The bandage is finished by fixing it with a pin.

It will thus be seen that the bandage describes a figure of eight, the upper and larger loop of which is round the body, and the smaller and lower loop round the thigh. To apply this bandage to the left groin follow the foregoing instructions, reading "left" for "right."

### THE RIGHT BREAST.

Apply the end of a four inch roller bondage (flannel is preferable) about three inches below the right breast, and make two horizontal turns from right to left round the body to fix it.

Carry the bandage upwards from beneath the right breast in front of the chest, over the left shoulder, and across the back, bringing it to the front at a slightly higher level than the horizontal turn. Continue this turn, also horizontally, round the body, keeping it throughout at a higher level than the first one. On coming round to the right breast the roll is again

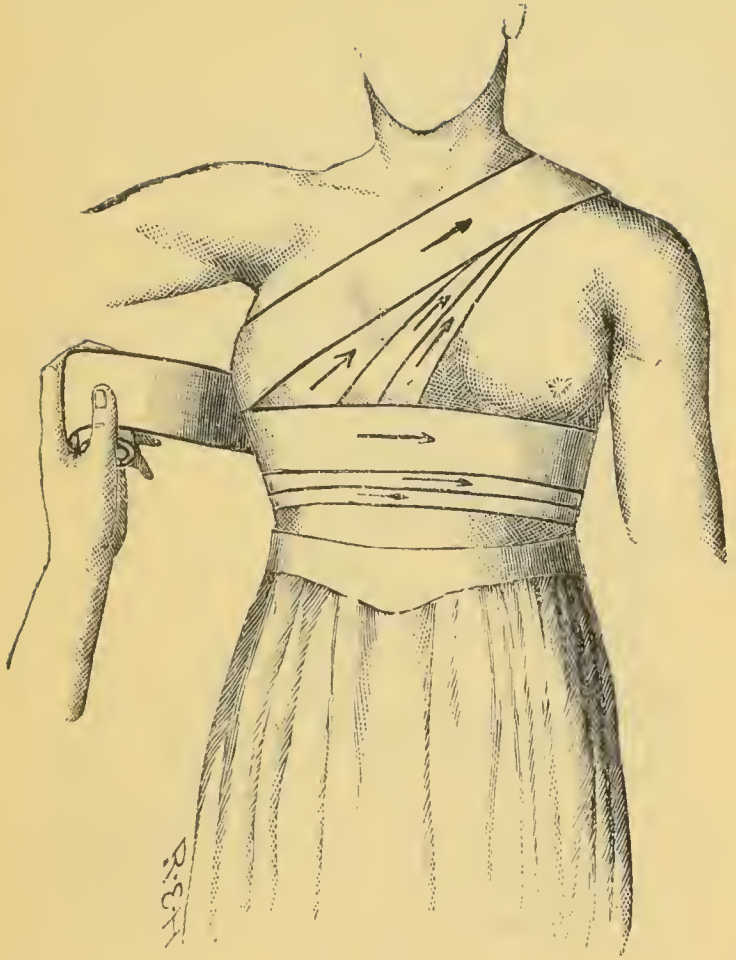


Fig. 20.

carried up to the left shoulder—this time covering half an inch more of the breast—and thence obliquely across the back until it once more joins the horizontal turn in front below the right breast.

These turns—the horizontal and the oblique—are alternately repeated, each at a higher level than the preceding one, until the breast is covered.

It will be seen that each horizontal turn fixes the preceding oblique one.

### THE CAPELLINE BANDAGE.

Fasten two $2\frac{1}{2}$ inch roller bandages together and wind

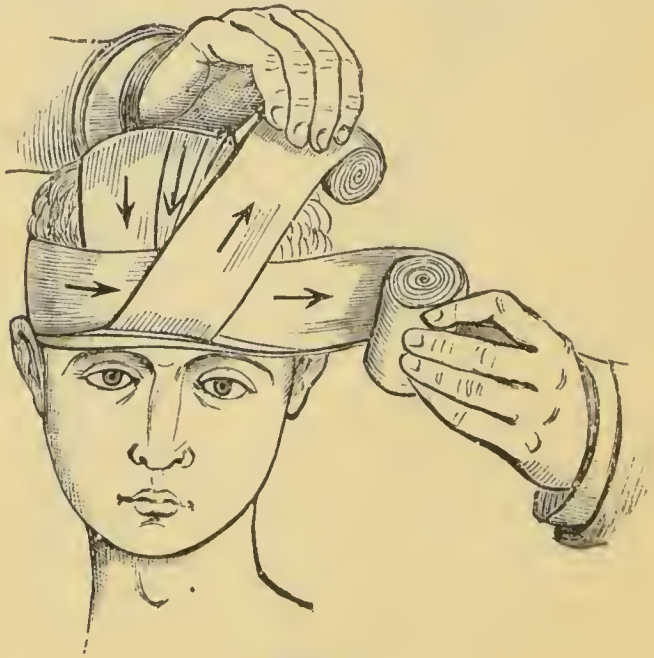


Fig. 21.

off rather less than half of one on to the other, thus making a double-headed roller with one head about three times as large as the other.

Stand behind the patient, who should be seated, and take the large roller in the left hand, and the small roller

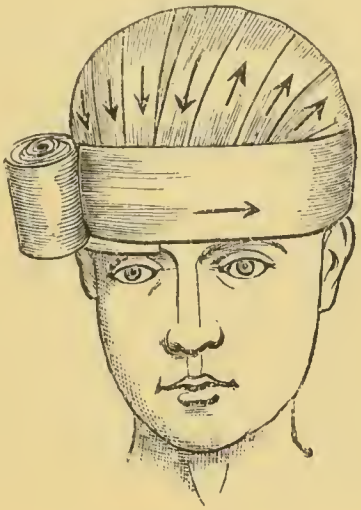


Fig. 22.

in the right, and apply the bandage to the forehead immediately above the eyebrows. Pass each roll horizontally backwards above the ears until the hands meet in the middle line at the back of the head, as low as practicable.

Cross the large roll over the small one. Transfer the large roll to the right hand, and the small to the left hand, and pull the bandages tight.

Now carry the small roll upwards along the middle line over the head and down to the root of the nose.

The small roll is called the "Vertical bandage," while the large roll is termed the "Horizontal bandage."

Bring the large roll (now in the right hand) horizontally forward above the right ear, making it cross and thus fix the Vertical bandage at the root of the nose. Now take the Vertical bandage back over the top of the head a little to the left of the middle line, fixing it behind, as in front, by the Horizontal bandage. Bring it once more to the front, this time a little to the right of the middle line, and again fix it by the Horizontal bandage.

Continue carrying the Vertical bandage from before backwards on the left, and from behind forward on the right, diverging each time from the middle line, until the ears are reached, when it may be cut off in front.

The Horizontal bandage thus simply encircles the head to fix the Vertical one as it passes backward and forward.

The whole bandage is finally secured by giving the Horizontal bandage two extra turns round the head and pinning it in front.

# APPENDIX I.

## DIETS.

The following are the diets generally ordered:—

*Ordinary* or *full diet.*—It consists of meat, bread, vegetables, &c., in variety.

*Low diet.*—"Slops," such as tea, weak broth, barley water, thin gruel, arrowroot, &c.

*Milk diet.*—Milk, arrowroot, sago, tapioca, rice, bread, &c.

*Vegetable diet.*—Meat is dispensed with, fish and fowl being, however, generally allowed occasionally.

*Meat diet.*—Meat, cheese, eggs, milk, beef-tea, broth, &c.

*Diabetic diet.*—This consists of all articles that do not contain either sugar or starch. Meat, bran, and gluten bread, almond rusks, thin, well-browned toast, Van Houten's cocoa. Milk is also generally allowed.

### SICK DIETARY.

*Hot milk and soda-water.*—Heat milk until it is just about to boil; pour out half a tumbler, and fill up the tumbler with soda-water. To be taken whilst effervescing. (Good for sickness of stomach as a stimulant, and for chills and rigors.)

*Beef-tea.*—Take a juicy slice off the top side of the round, cut it up finely on a board, removing skin and fat, put in into a stone jar with its own weight of water, put the lid on the jar and tie paper over it. If possible,

let it soak for an hour. Place it on the hob for three hours, and then for half-an-hour in the oven or standing in a saucepan of boiling water. When cold, skim and heat up as required.

(Good beef-tea should never be boiled. It ought *not* to jelly.)

*To make beef-tea rapidly.*—Chop half a pound of beef fine, removing all fat, &c., put it in a saucepan with half-a pint of cold water. Bring it quickly to the boil, and allow it to boil for five minutes

*Beef-tea and veal broth.*—One part of veal broth may be added to two parts of beef-tea.

*Beef-tea and oatmeal.*—Mix two tablespoonfuls of oatmeal with the some quantity of cold water. Add a pint of strong beef-tea, boil for five minutes, stirring all the time.

*Raw beef essence.*—Take half-a-pound of raw beef, free from fat, chop it up fine, pour over it a teacupful of soft water, add a pinch of salt, stir, and let it stand for three hours, strain, washing the meat with a little additional water. The addition of four or five drops of hydrochloric acid makes the process more rapid. It should be taken cold. The red colour can be disguised by giving it in a coloured claret glass.

(This is a most useful preparation, and can sometimes be taken—even by very young children—when the stomach will retain nothing else.)

*Mutton broth.*—Use a piece of the scrag of mutton, taken as near the head as possible. A pint of water should go to a pound of meat.

*Bread and milk.*—Cut some thin slices of stale bread, place them in a basin, make the milk boil, and the

moment it rises pour it over the bread. Cover the basin with a plate, and let it stand before the fire for ten minutes.

(Patients—particularly when convalescing—like it made thus better than when the bread is broken up.)

*Gruel* may be made with water or milk, or a mixture of both. Place two tablespoonfuls of oatmeal in a saucepan, add a little water, and mix well, add a pint of milk or water, and let it boil gently for half an hour, stirring frequently. Flavour with sugar or salt.

(Milk gruel is a most nutritious food.)

*Rice.*—Put one part of well-washed rice with five parts of milk in a pie-dish, a little cinnamon, a laurel-leaf, or any other flavouring may be added. Place in the oven for an hour or more. The milk must not boil, and the rice must be thoroughly cooked.

*Potatoes.*—Wash and brush them well, but do not break the skins. Throw them into boiling water. In two minutes draw the saucepan to the side of the fire, and do not let the water quite boil again. (The first plunge into boiling water hardens the outside of the potato, and the subsequent application of heat causes the starch grains to swell, until they at length burst the outer skin, and a *mealy* potato results. Potatoes put into cold water become sodden, and so cannot become mealy.)

*Eggs.*—Put into boiling water, draw the saucepan to the side of the fire, and do not let the water come to the boil again. In five or six minutes the eggs will be done. (The whites should be *thickened* but *not hard.*)

*Nutritious blanc-mange.*—Things required:—Three-quarters of a pint of milk, three-quarters of an ounce

of gelatine, two ounces of veal suet, a dessert-spoonful of pounded white sugar, and a piece of lemon rind. Soak the gelatine in a little milk, put the rest of the milk in a saucepan with the suet, and let it simmer twenty minutes. Strain, and add the other ingredients. Stir often until cold.

*Solid tea.*—Pour boiling milk on some *good* tea, strain, add some isinglass (previously soaked in milk). Pour it into a shape.

*Solid coffee* can be made in the same way. (Patients sometimes absolutely refuse food, but are willing to take tea or coffee; in such cases they can generally be got to take the "solid" tea or coffee, and of course get all the benefit of the milk.)

*Milk coffee* (also of use in the same class of cases).

*Milk and soda water.*—Nearly boil a teacupful of milk, and dissolve a teaspoonful of sugar in it. Put it into a large tumbler, and add half, or more, of a bottle of soda water. (In weak states of the stomach.)

*Arrowroot and black currant drink.*—Boil some black currant preserve in a quart of water, and strain. Mix a teaspoonful of arrowroot in cold water, and pour the boiling liquor on it, stirring meanwhile. To be taken cold. (Particularly good in affections of the throat.)

*Lemonade.*—Rub two or three lumps of sugar on the rind of a lemon, squeeze out the juice, and add half a pint of cold water, or, better still, a bottle of soda water.

*Orangeade.*—The juice of three or four oranges and one lemon, with a little sugar, are to be added to a quart of cold water.

*Apple water.*—Roast three apples, remove any

burned parts, put them into a jug with lemon peel and sugar, pour in a pint of boiling water. To be used cold.

*Toast water.*—Take a piece of crust of bread and toast it brown all over (it must not be burned). Put it into a jug and pour some cold water over it. Let it stand for half an hour before it is used.

(Apple water and toast water are good mixed.)

*Barley water (Thin).*—Put two ounces of well-washed barley into a jug, with the outer peel of a quarter of a lemon and a little sugar, pour in a pint of boiling water. Let it cool and strain for use.

*Barley water (Thick).*—Put two ounces of well-washed barley into a saucepan with a quart of cold water, boil it for two hours, strain into a jug in which the outer peel of half a lemon and sugar have been placed.

(The addition of a little lemon juice is a great improvement to barley water.)

*Rice water.*—Wash three ounces of rice well, and put it into a quart of boiling water, boil for an hour, strain and sweeten. Cinnamon may be added.

*Linseed tea.*—Put three tablespoonfuls of linseed into a teapot or jug, pour in a quart of boiling water, cover and let it stand a quarter of an hour to draw, strain, sweeten with honey or sugar, and use.

*Bran tea* is made in the same way.

*Ice.*—Put a piece of wood into a basin, place the block of ice on it, and cover with flannel.

Break off pieces when required with a fine needle stuck in a cork.

Tie a piece of muslin very loosely over a tumbler, so as to form a sort of purse. put the small pieces of ice on the muslin, and leave the tumbler within the patient's reach.

*To quench thirst* the following drinks may also be used : —

Weak coffee (an ounce to two quarts of boiling water) sweetened and let cool.

Cold weak tea.

A quarter of a pound of oatmeal, boiled in three quarts of water, and sweetened with brown sugar.

Rice water, with a little tartaric or citric acid.

The juice of currants or raspberries, boiled in water with a little tartaric acid and sugar.

# APPENDIX II.

## NURSING REQUISITES.

All houses should contain :—

Lint.
Gutta-percha tissue, or oil-silk.
Cotton wool.
Sticking plaster.
Isinglass plaster.
Roller bandages.
A waterproof sheet.
Linseed or olive oil.
Linseed meal.
Mustard.
Turpentine.
Paregoric.
Ipecacuanha wine.
Sal volatile.
Castor oil.
Vaseline.
Carbolic acid powder or Sanitas.
Spongio-piline.
Carbolic or coal tar soap.
Invalid's drinking cup.
Measuring Glass.
Thermometer marking to boiling point.
A plank of $\frac{1}{4}$ or $\frac{3}{8}$ in. wood, at least five feet long.

# APPENDIX III.

## MEASURES.

60 grains make a drachm.
8 drachms make an ounce.
16 ounces make a pound.
20 ounces make a pint.
60 minims make a fluid drachm.
A fluid drachm makes a tea-spoonful.
2 fluid drachms make a dessert-spoonful.
4 fluid drachms, or half an ounce, make a table-spoonful.
8 fluid drachms, or one ounce, make two table-spoonfuls.
2½ fluid ounces (about) make a wine-glassful.

## THERMOMETERS.

| | Freezing point. | Human temperature in health. | Boiling point. |
|---|---|---|---|
| Fahrenheit (F.) | 32° | 98·4° | 212° |
| Centigrade (C.) | 0° | 37° | 100° |

So that five degrees Centigrade are equal to nine degrees Fahrenheit.

# St. John Ambulance Association.

## ABRIDGED PRICE LIST.

Stores of the value of 10s. or upwards will be sent carriage paid to any part of the United Kingdom.

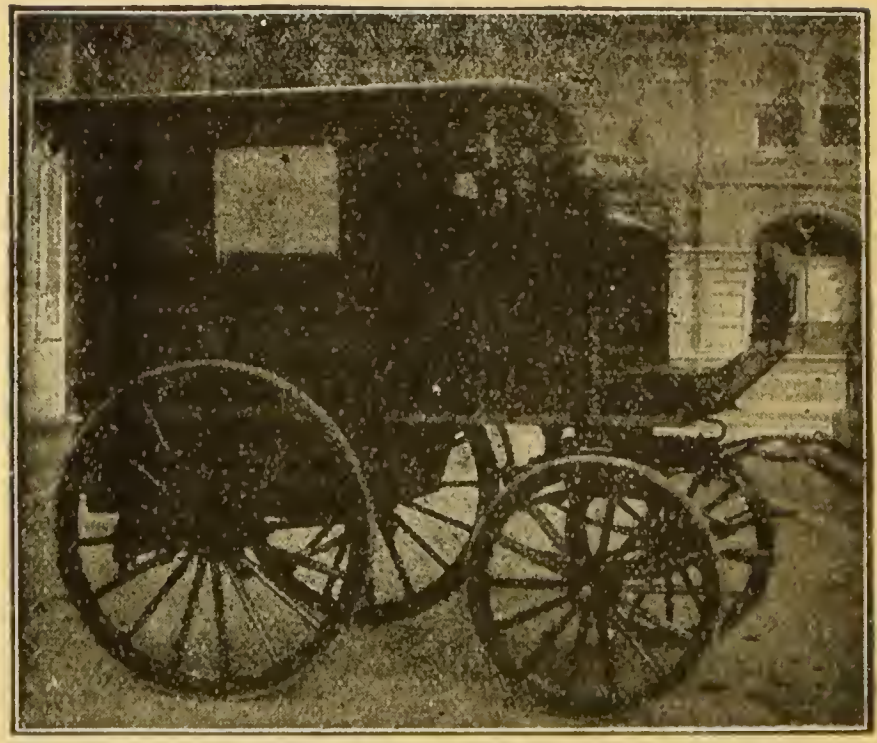
Owing to the great and continuing advance in prices it is impossible to guarantee that the quotations herein can be adhered to.

Quotations will be furnished for Articles relating to Ambulance Nursing and Hygiene, not mentioned in this list.

Orders and correspondence should be addressed to the St. John Ambulance Association, St. John's Gate, Clerkenwell, London, E.C.

Remittances should be made payable to the St. John Ambulance Association, and crossed "London and Westminster Bank, Lothbury."

# HORSE AMBULANCE CARRIAGES AND WAGONS.

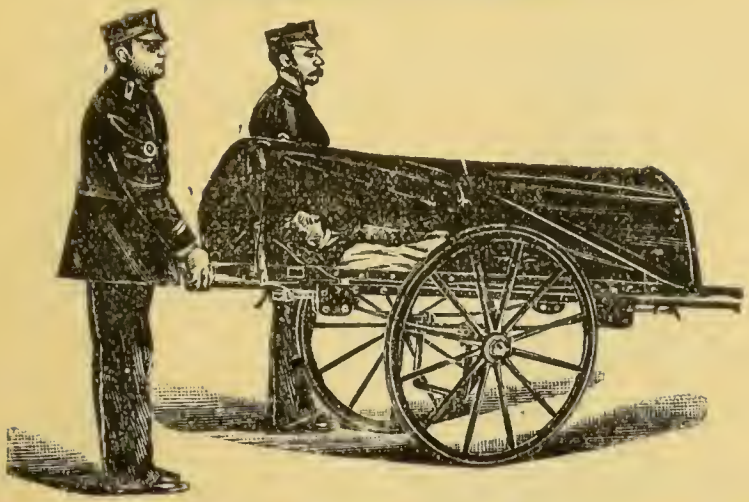


The St. John Ambulance Association Carriages and Wagons are now so universally adopted that but little description is needed.

The price of these varies, according to size and fittings, from £50 for the lightest and simplest form to £150 for an elegant private omnibus, which is fitted for the use of an invalid or for the ordinary purposes of a family at home or abroad.

Particulars, estimates, and list of places supplied will be sent on application.

# ASHFORD LITTERS.

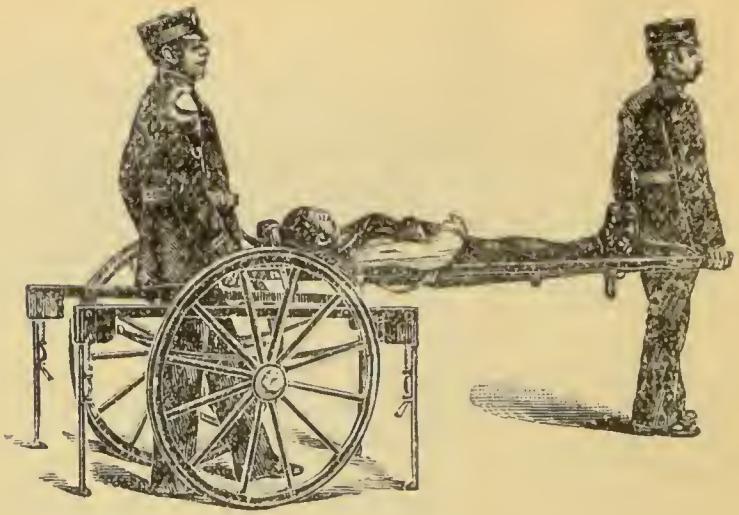


The "Ashford" Litter consists of a two-wheeled under-carriage fitted with elliptical springs, and either of the "Furley" stretchers, with a cover so arranged on a jointed frame that it can be folded up inside the stretcher, or with a hood and apron (*see page* 6). The under-carriage having a cranked axle, the bearers can pass between the wheels with the stretcher, and thus avoid lifting it over them. When travelling, the legs of the under-carriage are raised, and thus form the handles by which to propel it. Should it be necessary to pass over rough ground, two bearers can easily lift the litter and patient.

The improvements in the "Ashford" Litter (1899 models) include all those in the stretchers mentioned on page 7, and relate also to the mechanism of the combined legs and handles, which can now, by one movement only, be instantaneously raised or lowered, and fixed with absolute security in the proper position. The appearance of the litter is enhanced, and all fouling of the stretcher with the handles of the under-carriage is avoided.

For Prices see page 5.

## ASHFORD LITTERS (continued).



A new and further improved pattern under-carriage has recently been introduced, having the two legs on each side coupled, so that when one is raised or lowered that on the same side at the other end of the under-carriage is also raised or lowered. This pattern is recommended with confidence, as the coupling is found to materially simplify the handling of a litter, owing to the fact that it gives to one man complete control of the four legs from either end. The mechanism is unavoidably somewhat more elaborate than in the ordinary pattern, but with reasonable care it is not likely to get out of order.

The extra cost is £1 10s. 0d. per litter.

# PRICES OF THE IMPROVED ASHFORD LITTER, 1899 MODEL,
## Without New Coupling Arrangement.

| | With Iron Tyres to Wheels. | | | With India-rubber Tyres to Wheels. | | |
|---|---|---|---|---|---|---|
| | Without Cover or Hood and Apron. | With Cover. | With Hood and Apron. | Without Cover or Hood and Apron. | With Cover. | With Hood and Apron. |
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Under-carriage (no Stretcher)... | 8 10 0 | 9 5 0 | 11 0 0 | 11 15 0 | 12 10 0 | 14 5 0 |
| Litter complete, with Ordinary Stretcher* ... ... ... ... | — | 11 2 6 | 12 17 6 | — | 14 7 6 | 16 2 6 |
| Litter complete, with Telescopic-handled Stretcher† | — | 11 10 0 | 13 5 0 | — | 14 15 0 | 16 10 0 |
| Litter complete, with Police Stretcher‡ ... ... ... ... | — | 12 2 6 | 13 17 6 | — | 15 7 6 | 17 2 6 |

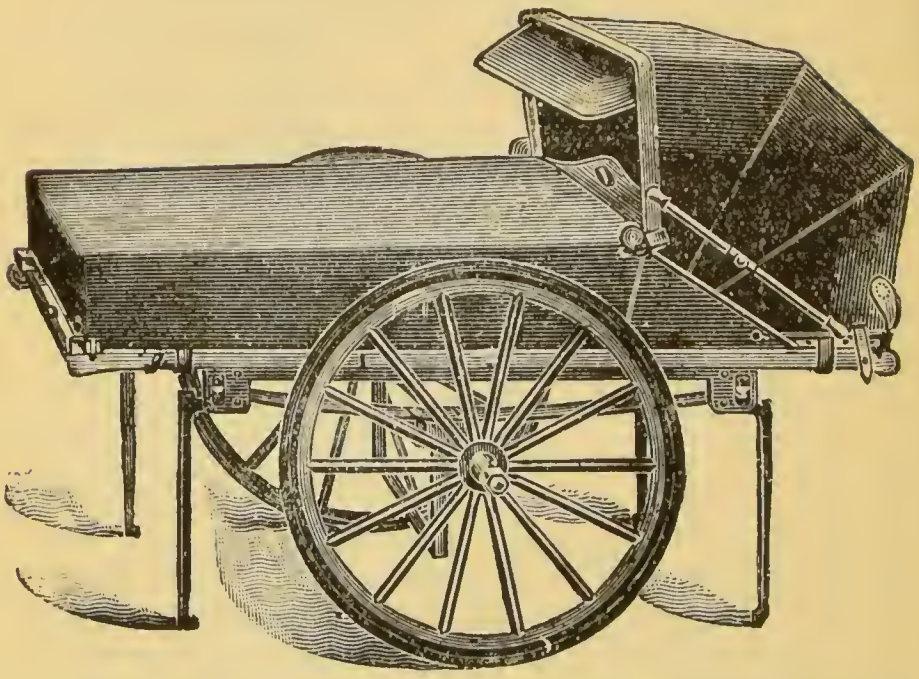
* Prices quoted for Litter with Ordinary Stretcher include Wide Webbing Slings, but no Chest Strap. Leather instead of Webbing Slings, 5s. 6d. extra. Chest Strap, 1s. 6d. extra. If supplied without any Slings, 4s. allowed.

† Prices quoted for Litter with Telescopic-handled Stretcher include Wide Webbing Slings and Chest Strap. Leather instead of Webbing Slings, 5s. 6d. extra. If supplied without any Slings, 4s. allowed, and if without Chest Strap, 1s. 6d. allowed.

‡ Prices quoted for Litter with Police Stretcher include Wide Webbing Slings, and Leather Straps for securing a refractory patient. Leather instead of Webbing Slings, 5s. 6d. extra.

**Extra to any pattern litter or under-carriage. Coupling arrangement as described on previous page £1 10s. 0d.**

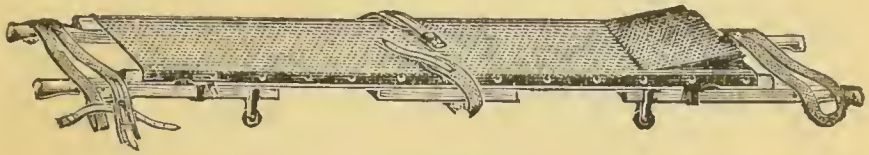
## SPECIAL HOOD AND APRON.



The Hood and Apron illustrated above have been introduced to take the place of the cover sometimes supplied as part of the "Ashford" Litter, and afford much greater comfort to the patient. The material of which they are made has been specially selected on account of its strength and waterproof qualities. They can be fitted to any "Furley" Stretcher or "Ashford" Litter. Complete extra sets of sockets and studs can be supplied at a nominal cost.

| PRICE. | £ | s. | d. |
|---|---|---|---|
| Hood and Apron, complete ... ... ... | 2 | 10 | 0 |
| Extra Sockets and Studs, per set ... ... | 0 | 1 | 6 |
| **Waterproof Sheet** (washable) to be laid on the stretcher bed ... ... ... ... ... | 0 | 10 | 6 |

# "FURLEY STRETCHERS WITH THE LATEST IMPROVEMENTS. 1899 MODELS.



TELESCOPIC-HANDLED STRETCHER—OPEN.

ORDINARY STRETCHER—CLOSED.

The improvements in all patterns of the "Furley" Stretcher, 1899 Model, are numerous. The comfort to the patient is increased; the stretcher is stronger, more rigid, and lighter, it folds up more closely, and its handles are more comfortable to hold, and afford greater protection to the hands of the bearers in passing through narrow doorways or passages. Should it be necessary to reduce the width of a loaded stretcher in order, for example, to carry it into a railway carriage, this can be done, either when it is resting on the ground or supported by the bearers, without trouble and without the slightest jar to the patient. The price of the stretchers is lowered. All minor points have been most carefully considered, and the stretchers are confidently recommended as thoroughly efficient in every way.

These stretchers are adapted for use alone or as part of the "Ashford" Litter, and the cover, hood and apron, army rug, and special rug with air cushion and waterproof sheet, described in this list, are suitable for use with them.

# PRICES OF THE "FURLEY" STRETCHERS, WITH THE LATEST IMPROVEMENTS (1899 MODELS).

N.B.—The prices of the Standard Models are shown in heavy type.

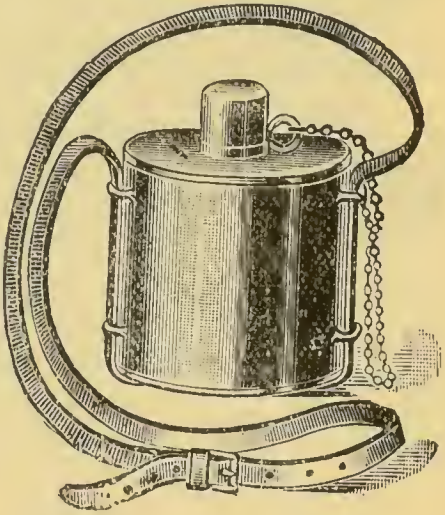
| | Without Slings or Chest Strap. | With Wide Webbing Slings (no Chest Strap). | With Wide Webbing Slings and Chest Strap. | With Leather Slings (no Chest Strap). | With Leather Slings and Webbing Chest Strap. |
|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Ordinary Stretcher, for General and Brigade use, taking the place of both the old ordinary and military patterns ... ... | 1 13 6 | **1 17 6** | 1 19 0 | 2 3 0 | 2 4 6 |
| Telescopic-handled Stretcher, for working in confined spaces. | 1 19 6 | 2 3 6 | **2 5 0** | 2 9 0 | 2 10 6 |

| | £ | s. | d. |
|---|---|---|---|
| Police Stretcher, very strong, with Ash Poles, and provided with Leather Straps to secure a refractory patient— | | | |
| Complete, with Wide Webbing Slings ... ... ... ... | **2** | **17** | **6** |
| ,, ,, Leather Slings ... ... ... ... | 3 | 3 | 0 |
| Slings, Wide Webbing ... ... ... ... ... per pair | 0 | 4 | 0 |
| Do. Leather ... ... ... ... ... per pair | 0 | 9 | 6 |
| (Or if purchased with the Stretcher instead of Webbing Slings, 5/6 extra). | | | |
| Cover for Stretcher ... ... ... ... ... ... ... ... | 0 | 15 | 0 |
| Superior Hood and Apron (*see illustration, page 6*) ... ... ... | 2 | 10 | 0 |
| Spare Bed for Stretcher ... ... ... ... .. ... ... | 0 | 8 | 6 |
| Army Rug, to cover patient on Stretcher ... ... ... ... | 0 | 6 | 6 |
| Superior Rug, fitted with Air Cushion, for use on Stretcher, or when travelling ... ... ... ... ... ... ... ... | 1 | 5 | 0 |

## "LOWMOOR JACKET."

For use in mines, ships' holds, &c., to secure a patient on a stretcher (see illustration), which can then be placed in an upright position. Price £1 5s.

## WATER BOTTLE.



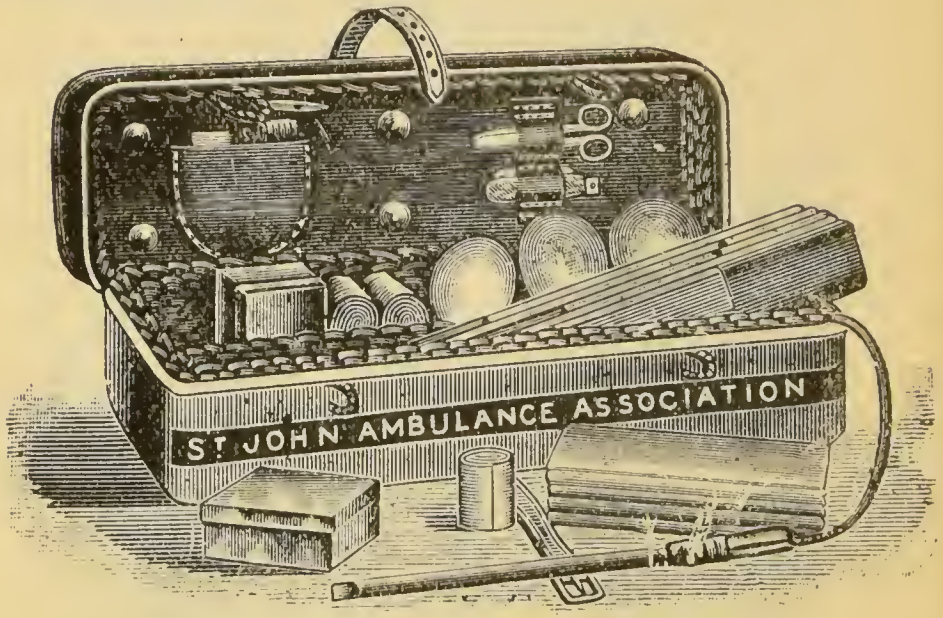
Copper tinned, with carrying strap.

Price 6s. 6d.

Enamelled Iron Water Bottle, Cloth covered, with Strap. Price 6s. 6d.

## SMALL AMBULANCE HAMPER.

With Waterproof Cover and Strap, for use in factories, collieries, stations, and large works, as well as for parochial and domestic use.




CONTAINING

1 Set Splints. 1 Elastic Tourniquet. 3 Tampons, for washing wounds. 2 Packets Lint. 4 Roller Bandages ((wide and narrow). 4 Triangular Bandages.

Cotton Wool ... ... ...
Boric Wool ... ... ... } In Tin Cases.

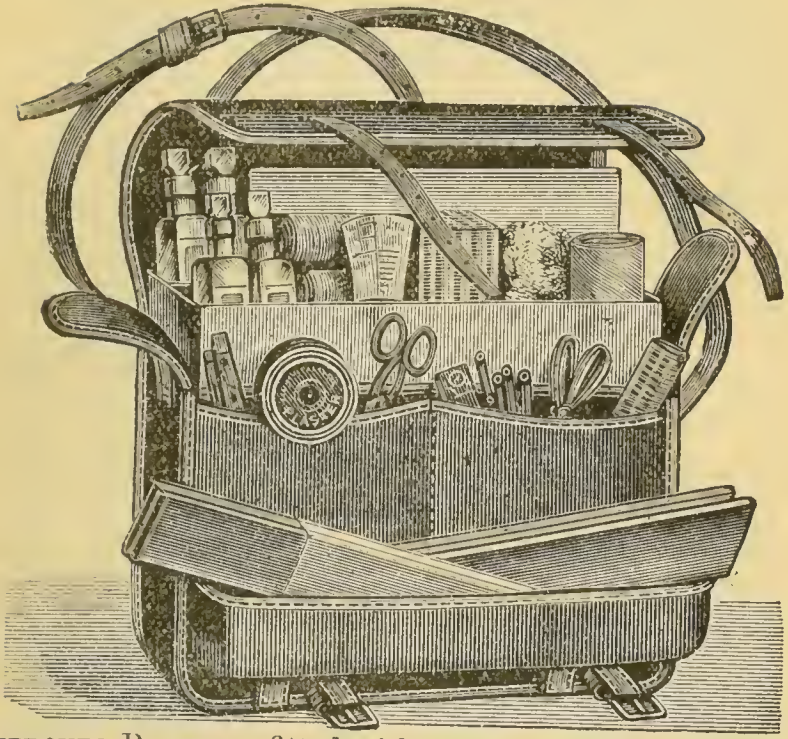
Spool of Adhesive Plaster.

Knife, Scissors, Thread, Tape, Needles, and Pins.

Weight, complete, 6½ lbs.

Length, 1 ft. 6 in. Depth, 5 in. Width, 7 in. Price, £1 11s. 6d.

## SURGICAL HAVRESAC.



IMPROVED PATTERN, fitted with a tin so arranged that any article can be taken out without disturbing the rest of the contents.

Contents: 1 Set of Splints, 6 Triangular Bandages, 6 Roller Bandages, wide and narrow, Cotton Wool, Boric Lint, in tin cases; 1 Roll Adhesive Plaster, 1 pair Scissors, 1 Knife, 2 oz. Olive Oil, 2 oz. Tinct. Eucalyptus B.P.C., 2 oz. Sal Volatile, 2 oz. Spirits Ether Comp., 1 Graduated Glass Measure, 1 Elastic Band Tourniquet: Pins, Needles, and Thread.

Price £1 11s. 6d.

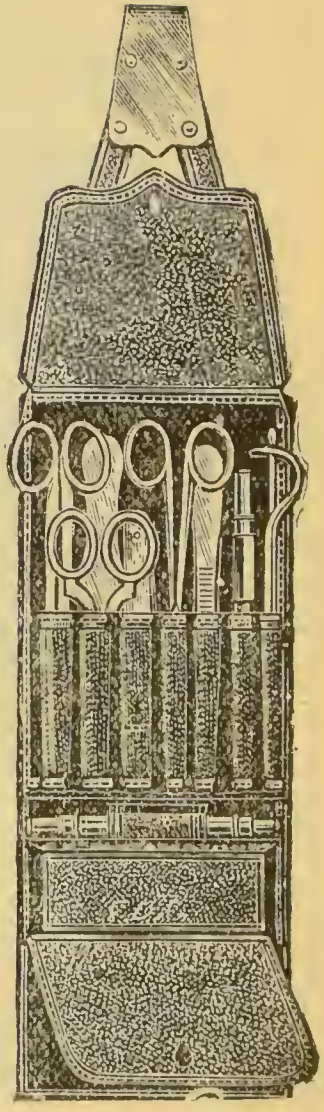
## NURSES' WALLETS.

ORDINARY PADLOCK SHAPE.

Without instruments, 4s. 3d.

Fitted complete, containing Bow Dressing Forceps, Spatula, Probe, 2 pairs Scissors (round and sharp pointed), Clinical Thermometer, and Knife.

Price 8s. 9d.



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ST. JOHN'S PATTERN, as illustrated, but improved by the addition of flaps to protect the instruments.

Without instruments, 7s. 9d.

Fitted complete, containing Bow Dressing Forceps, Artery Forceps (also useful for dressing), Spatula, Probe, Director with Ear Scoop, 2 pairs Scissors (round and sharp pointed), Clinical Thermometer (minute, round), Knife, Pencil, and Safety Pins.

Price 21s.

**Dressing Basin,** kidney-shaped, made of enamelled iron. Price 1s. 3d.

**Knife,** with Strong Blade ... each 9d. ; per doz. 8s.

**Pair of Scissors** ... ... ... each 1s. ; per doz. 10s.

---

**Carrying Sheet** for carrying patients up and down stairs or otherwise about a house. Designed by J. C. Derham, Esq., Blackpool, and Mrs. Alfred Paine, Bedford. The sheet is fitted with rope handles and detachable bamboo poles, and may be placed on a stretcher without disturbing the patient. Price complete, 15s.

---

| | s. | d. |
|---|---|---|
| **Tourniquet,** Elastic ... ... ... ... ... | 1 | 6 |
| **Tourniquet Braces** (serve as Braces or Tourniquet) | 2 | 6 |
| **Splints,** Wooden, per set, 2s. 6d. ; Cane, per set | 7 | 6 |
| **First Field Dressing** (Army Regulation Pattern), Price ... ... ... ... ... ... each | 0 | 9 |
| **Jaconette,** 44 inches wide ... ... per yard | 2 | 3 |
| **Carbolised, or Styptic, Tow** ... ... per lb. | 0 | 9 |
| **Tow** (Plain)... ... ... ... ... ,, | 0 | 6 |
| **Waterproof Lint** (in case to hang on wall) ... | 2 | 6 |

---

## SAFETY PINS.

All fasten or unfasten on either side.

| | | |
|---|---|---|
| Facile No. S 600 or S 602 ... ... ... per doz. | 0 | 2 |
| Duchess Duplex, No. 2 ... ... ... ... ,, | 0 | 2 |
| ,, Assorted ... ... ... ,, | 0 | 3 |
| Special Blanket Safety Pins, 3-in. ... ... ,, | 1 | 0 |
| ,, ,, ,, ,, 3½-in. ... ... ,, | 1 | 6 |

## TEXT BOOKS, &c.

"First Aid to the Injured." By James Cantlie, M.B., F.R.C.S. The authorised text book of the First Aid Course. 1s. ; by post, 1s. 2d.

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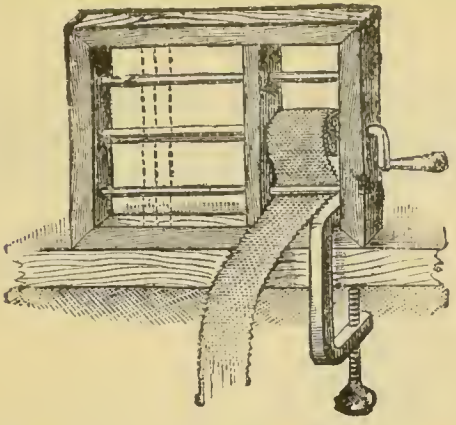

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